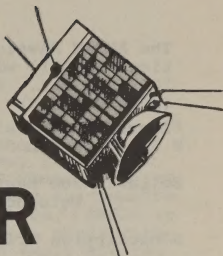




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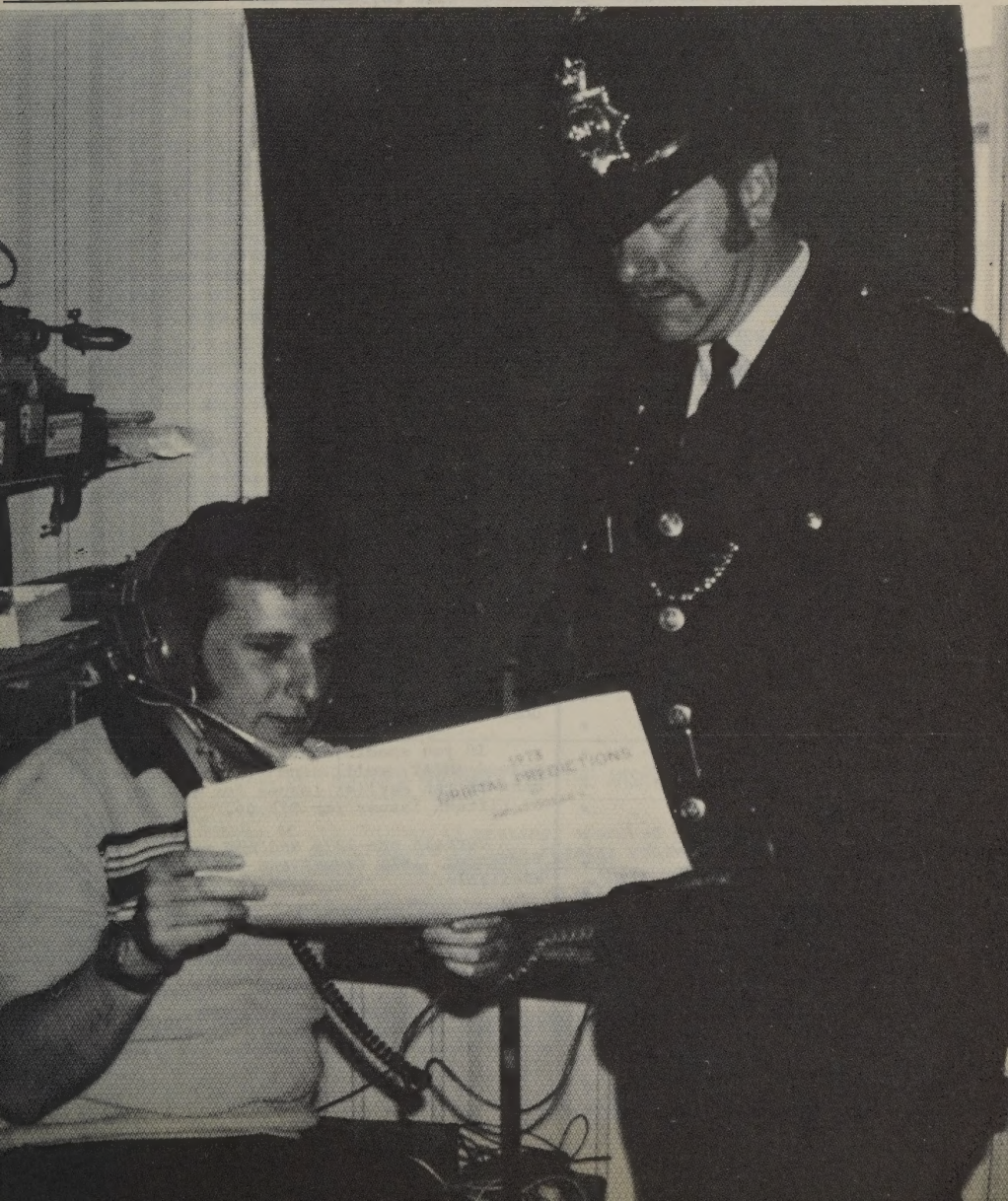
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Copy Deadline for
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COVER PICTURE

G3ZCZ (seated) explaining
certain suspicious move-
ments in space to G4DME
in the shack of G3RWL.

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BACK ISSUES AVAILABLE

Back issues of the Newsletter are available upon request in return for a donation to AMSAT.

If you specify what year you first joined AMSAT, we'll send you an assortment of ten earlier issues for \$10.00, or fifteen issues for \$15.00.

Certain pre-1974 and the September 1975 issues are not available.

Note that due to the time and effort involved in servicing back issue requests, the minimum donation should be \$10.00.

Write to Back Issues, AMSAT,
P.O. Box 27, Washington, D.C., 20044.

EDITORIAL

By Joe Kasser, G3ZCZ

Voices raised in protest seem to be a common denominator in many groups and organizations these days and AMSAT is no exception. The Letters and Comments pages in this Newsletter reflect the increased flow of communications between the members and this Editor. Any organization should serve the needs of its members. AMSAT is such a unique and diverse group that it is difficult to establish those needs without inputs from the members. A few active members have communicated their desires and AMSAT headquarters has realized that the growth of the organization has modified it and changes are in progress. The first of these can be seen as the change in the bylaws in the way that candidates for election to the Board of Directors are nominated. More changes will follow. If you have any suggestions do not hesitate in advising us of them. Your suggestion will be given the consideration that it deserves.

On the subject of organization. The March issue of the Newsletter will carry the Country/Area-Coordinator and Net information. If you are a net controller or a coordinator, please verify your net still meets (day, time and frequency), or advise of new ones and if you are a coordinator, likewise send in a note confirming that you wish to continue in your position.

The "Is This The Future" column in the last Newsletter seems to have had a universal negative response. Nobody seems to want to make satellite communications easier. Does anybody agree with the concept? It should be pointed out that the gateway approach would not constitute the only approach. Phase II satellites are being built by organizations other than AMSAT. The ARRL is very keen on Mode A transponders. In fact, you can thank them for OSCAR-8. If it were not for their insistence on a Mode A replacement for OSCAR-6, OSCAR-8 would probably not be in orbit at this time. The use of computers in amateur radio opens a new era of communications capability. Did anybody read the articles in the November 1978 and January 1979 issues of Byte Magazine?

Synchronous orbits, Phase III orbits, Phase II orbits all lie in our future, but just as conventional amateur radio contains a myriad of different interests (such as 75 meter phone, 160 meter DX, VHF propagation, etc.) the satellites of the radio amateur space service will, in the future, provide different areas of interest. If you want the challenge of doing things the hard way, you'll have it. If you want reliable point to point communications capability, you'll have it. If you want to tinker with terminals, gateways or computers, you'll be able to do it providing you support the program. We've come a long way since the launch of OSCAR-1 back in 1961, and we are going a lot further in the years ahead.

The best part of being an editor is reading the comments sent in by the readers. You may not get a timely reply, but your letters will be read, so keep them coming.

Joe, G3ZCZ

NOTICE OF PROPOSED AMENDMENT TO THE AMSAT BYLAWS

The AMSAT Board, at its October 15 meeting, approved a change in the Bylaws to permit the nomination of directors by five regular voting AMSAT members. Previously, only Member Societies could nominate directors, not individual members.

Comments on this proposed Bylaws change are invited. According to Article VIII of the Bylaws, changes in the Bylaws shall require approval of two-thirds or more of the Directors. Notice of an amendment which has received such approval shall be circulated to the membership. The amendment shall take effect thirty days after mailing of said notice, unless written objection is received from at least ten percent of the membership.

В КОСМОСЕ— РАДИОЛЮБИТЕЛЬСКИЕ СПУТНИКИ

Запуском искусственных спутников Земли «Радиолюбительские» для радиолюбительских связей СССР сообщают:
спутников «Радио-1» и «Радио-2» произойдет 145,880 — 145,920 МГц.
«Радио-1» и «Радио-2» производится в положении на частоте 29,400 МГц.
станавление на «Радио-1» и «Радио-2», радиокруглосудно, кроме понедельника и сроставляются для научно-технических экспериментов.
инок «Радио-1» и «Радио-2» — «РС».

"RS"...THE AMATEUR RADIO SATELLITES OF THE SOVIET UNION

By Pat Gowen, G3IOR

On October 26, 1978, at 0650 \pm 2 minutes UTC, the USSR launched the research satellite COSMOS 1045 from Plesetsk. Accompanying it were the first Soviet built amateur radio communications satellites, "RS1" and "RS2", Radio-amateurs-Sputniki, or Radio-amateur Satellites, the initial letters conveniently forming a call in the prefix block allocated to the Soviet Union.

AMSAT and its devotees have keenly been looking forward to these satellites ever since the building of the hardware by UA3CR, UA3DV, UB5UG, UB5UN, UB5WN and other members of the Russian Satellite Group, and its early testing from a 16th floor residential apartment as published in the October 1975 issue of Radio (1). During the lead up to the actual launch, a series of articles also appeared giving the basic information required to work through the transponder, calculate the orbital period, and to explain the fundamental parameters (2). The article used a period of 102 minutes as an example, and it was naturally assumed that the satellite would be carried aloft piggy-back with one of the USSR's "METEOR" Weather satellites, although it was secretly hoped by many that a launch from one of the MOLNIYA communications satellites into a highly elliptical high North Perigee might come about to provide a much needed "2 to 10" DX Satellite.

Possibly the first surprise came when the International Frequency Registration Board circular No. 1273 was published on 12 July 1977 when a "planned satellite network" was indicated, which portended something better than a single unit (3). An even bigger surprise came to your author when the first audible orbit came over his NNW horizon at 2012 UTC on 26 October, although it was not realized at that time that it was in fact descending in the evening. Ears, "S"-meters, back-to-front beam ratios, high angle ducting were all suspected until the obvious was identified during the progress of the pass! Despite the lack of knowledge of which direction to beam, what the frequency relationship was, measuring the TCA doppler, recording TLM, measuring the pass-band width, by some miracle G3IOR and G3FP managed to make what we believe was the first, albeit scratchy, UK QSO via RS, exchanging 4/579 on CW, and 47 on SSB. With surprises in vogue, the pass finally went out, apparently to the SW, at 2137 UTC... an access period of 25 minutes! This greater than the 16 minute access overhead longest pass on AMSAT-OSCAR 8, and even much greater than the maximum of 22 minutes possible with the AMSAT-OSCAR 7 spacecraft. Obviously, "RS" was in a very much higher orbit than that which was originally expected, and relationship between beam direction, apparent elevation and doppler shift rate confirmed the findings.

Immediately, the first task was to get the news across to AMSAT, but not a soul could be roused in "W" through the satellites and the AMSAT-HQ telephone remained unanswered (as it was going-home-from-work time in the U.S.A.). Luckily, a group including a third district "W" permitted my invasion of their net on 14 MHz and the news of the occasion and the forthcoming orbit was put over the AMSAT Washington repeater.

It soon spread like wildfire for many USA stations were in evidence on the following orbit some two hours and five minutes later, and contacts were effected with both New England and Florida. Now Florida is extreme distance from Norwich England, and only workable for a maximum of one minute even via OSCAR 7. This time we were in there with mutual access for five minutes...now we knew we had a really high orbit, though I still thought it might be elliptical at the time!

The following day, G3LDI, G8QR and G8IFF, all Norwich OSCAR enthusiasts, were fortunate enough to be enjoying a day's rest at home. We changed this by enlisting their aid in monitoring 29.4 MHz to find AOS, TCA and LOS of all possible orbits during that day. The result was a fairly well established 120.3 minute orbit, at an inclination of around 82° , with South to North morning and North to South evening crossings.

Other surprises included the extremely high sensitivity, needing only 1 watt from a vertical dipole to give G8QR a 599 return. The strength of the downlink and the beacon, particularly under highly ionized E, F1 and F2 conditions giving a high MUF, was very noticeable, coupled with the relative freedom from rotational polarization. It was assumed at this time that an isotropic radiator was employed on the spacecraft, and early stabilization had taken place - the result in truth was another surprise yet to come!

The TLM format presented a headache and little could be resolved by casual observation in the early stages. Later, confirmation by AMSAT's source, NASA, the Slough tracking station in England, and Geoff Perry of Kettering School which has a very keen group, showed that our early orbital information was approximately correct, with a disagreement of less than 1% between any group's figures even at that early stage. They reported that A PAIR of RS satellites were in orbit along with COSMOS 1045, and this was later confirmed by a TASS release, 5-11 of 1103 on 27 October, which called the satellites "RADIO 1 and RADIO 2" (4). Telemetry of some of the earlier passes was submitted by G3IOR and G3MQD to the Kettering group for study analysis. Geoff Perry soon replied by pointing out that if one replaced the dots of the prefix letter of each group by the binary "0" and the dashes by binary "1", as with the second generation COSMOS navigational satellites that he had earlier studied, one came out with numbers transmitted in the opposite sense to that conventionally employed, e.g., from "P", "C", "F", "Z", "L" etc. came "6, 5, 4, 3, 2, 1, 0, ... 7, 6, 5, 4, 3, 2, 1, 0". He further pointed out that when the complete frame of fifteen channels was being sent the final character was constant in the frame, e.g., if for one frame the suffix was "U", then the following would be "K", continuing to alternate between "K" and "U" on successive frames. As the numerical values, e.g., the second and third characters, were significantly different between the "K" and "U" frames, he suggested a 30 channel sequence.

These observations and deductions were later proved, when RS3A, a special station set up by the satellite group from Moscow to disseminate information, operated by Leo Labutin, UA3CR, volunteered the information a week later. He stated that the TLM had either thirty channels or seven, and consisted of four forms, with calibration as follows:

Ch. No.	Prefix	Indicator	Measurement Levels	Decoding
1	P	Calibration level	01	TLM runs true if N=01
2	C	RF power output	60 to 990	10 N = P in mW.
3	F	Transponder Temp.	-30 to +80°C	N = T in °C
4	Z	TLM unit Temp.	-30 to +80°C	N = T in °C
5	L	Power supply voltage	+11 to +18 V	0.2N = PSV in volts
6	B	9 volt regulator	8.5 to 9.5 V	0.2N = RV in volts
7	H	7.6 volt regulator	7.0 to 8.0 V	0.2N = RV in volts
8	O	Solar Panel Voltage indicator No. 1	}	"... if in sun reads
9	W	Solar Panel Voltage indicator No. 2		01, if not in sun
10	K	Solar Panel Voltage indicator No. 3		reads 15, 16, 17, etc.
11	U	Solar Panel Voltage indicator No. 4		and 99 in total dark:"
12	G	As Channel 1		
13	R	As Channel 2		
14	D	Spaceframe ground calibration	01	

15 S Battery charge current 0 to ± 500 10(50-N) = Charge I.

Now the TLM will send "RS" if the transponder is NOT on, but "RS RS" if the transponder is commanded ON.

If the suffix is W, the transponder is ON

If the suffix is U, the transponder is OFF

If the suffix is R, the transponder is ON

If the suffix is S, the transponder is OFF

It has also been noted by G3IOR that the following seem to apply, though not given.

If the suffix is K, the transponder is OFF

If the suffix is D, the transponder is OFF

If the suffix is O, the transponder is ON

Now commences the long frame, indicated by a change of suffix, but a repetition of the original prefix letters.

Ch. No.	Prefix	Indicator	Measurement Limits	Decoding Equation
16	P	Battery No. 1 voltage	11 to 18 volts	$0.2N+12 = \text{Batt. V}$
17	C	Battery No. 2 voltage	11 to 18 volts	$0.2N+12 = \text{Batt. V}$
18	F	Battery No. 3 voltage	11 to 18 volts	$0.2N+12 = \text{Batt. V}$
19	Z	Battery No. 4 voltage	11 to 18 volts	$0.2N+12 = \text{Batt. V}$
20	L	Ground Calibration level		As Channel 1
21	B	Battery charge resistor temp	-30 to $+80^{\circ}\text{C}$	$N = \text{Temp in } ^{\circ}\text{C}$
22	H	As Channel 15		
23	O	As Channel 8		
24	W	As Channel 9		
25	K	As Channel 10		
26	U	As Channel 11		
27	G	As Channel 8		
28	R	As Channel 9		
29	D	As Channel 10		
30	S	As Channel 11		

Then RS, or RS RS, according to Mode.

From early study in the first two weeks, it would appear that the calibration is running true, that if "C" is greater than 99, then a reversion to beacon mode is automatically applied to prevent battery damage and exhaustion by high power stations in the uplink passband. (And this means anything greater than 10 watts e.r.p.). The transponder temperature seems to be running up to $60^{\circ}\text{C}+$, but this is not necessarily the temperature of the Ni-Cad cells. (The TLM unit is much cooler). The stabilized power supplies are holding well, and so are all of the batteries. Channels 8, 9, 10 and 11 (NB. also 23, 24, 25, 26, then 27, 28, 29, 30) are interesting, although we do not yet know their positions. One will note that voltage is read, not current, hence would assume that they could function as a sun-sensor, likewise an earth, moon, and cloud reflectance sensor, as the satellite rotates. Perhaps a form of digital weather forecasting might be tried when we know which is pointing at what.

The spacecraft can switch to a high speed CW TLM format, which appears at first sight to be composed of some sixty-five channels, probably two runs of 30 with five indicators, but much more research needs to be done on this format as yet.

"RS2" is stated to be an identical spacecraft, with virtually the same orbital characteristics. It was tested out up to orbit 16, and found to be functioning well, although slightly less sensitive as RS1. RS2 is now a backup, and will only be brought into use if necessitated by the state of RS1.

The basic characteristics of the satellite(s) are as follows, with the source used given in case of difference:

<u>Mean Altitude:</u>	1706 Km. (G3IOR)
<u>Apogee:</u>	1688 Km. (AMSAT ex NASA)
<u>Perigee:</u>	1724 Km. (" " ")

The current points of apogee and perigee are not yet known.

<u>Sensitivity:</u>	Recommended power uplink; 50-100 mW. (RS3A)
	1 watt e.r.p. gives a 599 return. All users

are asked to run that power which gives no more downlink strength than the 29.400 MHz beacon. QRO loading will cause loss of transponder.

<u>Uplink:</u>	145.870 - 145.915 MHz. (CW LF end, SSB HF end according to IARU and AMSAT recommendations) No FM. Avoid QRM on beacon at HF end. (G3IOR)
<u>Downlink:</u>	29.350 - 29.395 MHz corresponding to above uplink. (G3IOR)
<u>Inclination:</u>	82.5556° (RS3A)
<u>Period:</u>	120.389433 minutes. (RS3A)
<u>Increment:</u>	30.227°W/orbit (RS3A)

Daily period advance on previous day: 4 minutes 40.392 seconds. (G3IOR)

Daily incremental advance on previous day: 2.724° further West. (G3IOR)

<u>Power Source:</u>	Solar Cells. (NB. This will be worth watching to see if "cataract" occurs due to radiation damage from the intense Van Allen radiation belt that the RS satellites are in.) (RS3A NB=G3IOR)
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<u>Antennas:</u>	Inverted "V" for two metres, $\lambda/4$ for 10 metres. (RS3A) (Another surprise, as the satellite has NO stabilization other than that which will occur naturally due to braking in the Magnetosphere due to stray eddy currents, and ion friction). Yet the satellite is reasonably independent of either uplink or downlink polarization and seems remarkably free from deep fading.
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Problems: At this time, with the MUF well above 29.4 MHz, daylight passes can be a problem, as often the downlink may be very weak, or even attenuated out completely when at low post horizon angles due to the densely ionized layers through which the signal has to pass. The same layers have brought forth a number of very strong harmonics in the downlink band, notably TASS and RADIO MOSCOW. The spread of the FSK and the modulation obliterate the attenuated signal as negative doppler takes it closer in frequency to the QRM, and as the beam approaches the unwanted source, LOS is often premature. Hopefully these difficulties are short-lived, as the hours of daylight are decreasing fast now in the Northern Hemisphere, and less attenuation to the needed signal and an increasing amount to the unwanted will occur.

A larger problem is the unaware user. RS is designed with the USSR limit of 5 watts maximum input for technicians on the two metre band in mind, hence its superb sensitivity. 10 mW. from a hand held has been heard via the transponder on a quiet pass, but it is a very different story when unskilled operators as yet

unaware of the requirements are attempting to use it. 10 watts e.r.p. will block the ALC system, and render ALL signals, including the beacon, totally unreadable. If sustained, the transponder will revert to beacon mode, and once out of range of the Soviet command station, cannot be put on again until the next pass.

Possibly the greatest threat of all is that some amateurs, contrary to the internationally agreed IARU band plans, are employing channels within the 145.800 - 145.999 space band for simplex FM QSO's !! Most of these are using powers well above that required to switch the satellite, and at the very least occupy the entire band with noise when 145.875 and 145.900 are used. They are very difficult to identify, as the passband will either be blocked or shut off altogether when they are present. The only answer is for constant monitoring of the space section of the band to identify the intruders and to report them to their national society, who will take action as agreed at the last IARU Conference, and effect their removal to the band allocated.

In the past two weeks, RS 1 has already been used to give contacts to stations over 5,000 miles apart with less than 1 watt e.r.p. at mutual horizons and an interesting new concept has been brought to amateur radio, where one is obliged to modify existing commercially manufactured two-metre transmitters in order to REDUCE one's power to a degree which permits two-way mutual contacts to take place, and to use simple omni-directional antennas in place of multi-element directive arrays.

The Soviet Union Satellite Group has already started work upon a further satellite, and are anxious to have reports, results and telemetry input from world users in order to justify the launch of the next RS satellite. These should be sent to :

Moscow Radio Club
Box 88
Attn: RS3A
Moscow, USSR

They will be greatly appreciated. Our congratulations to the designers, builders, launchers and all involved in the highly successful RS which has now joined the International Amateur Satellite series.

Finally, I would like to acknowledge the help and aid of the following who have given of their time and effort to help produce the information in this article: DL3SX, G2BVN, G3AAJ, G3LDI, G3MQD, G8QR, G8IFF, LZ1AB, OK3CDI, G3YJO, G3RWL, N6DD, SP9DH, UA3CR, UA3DV, WA3NAN, G3NTV and Geoff Perry of the Kettering Satellite Group.

REFERENCES:

- (1) "RADIO" No. 10, October 1975. Article by S. Budin, UB5UN and F. Fekhel, UB5WN.
- (2) e.g., "RADIO" No. 9, September 1977. Article by V. Dobrozanskiy.
- (3) See I.F.R.B. Circulars No. 1273, 12 July 1977, and 1286, 11 October 1977. Special sections annexed No. SPA-AA/159/1273 and SPA-AA/176/1286.
- (4) TASS 5-11 of 1103 UTC, 27 October 1978. "RADIO 1, RADIO 2 and COSMOS-1045 SATELLITES".

U.S.S.R. RADIO SATELLITE AWARDS

Prizes will be awarded for Radio satellite contacts, for QSO's after 1416 Moscow standard time October 26, 1978, when the Radio transponder was first turned on. Applications go to Satellite Communication Committee of the RSF U.S.S.R., Central Radio Club, 88 Volokolamskoye Shosse, 123362 Moscow, U.S.S.R. (or for foreign applicants: P.O. Box 88, Moscow, U.S.S.R.) The first ten amateurs from each continent and the first sixty from the U.S.S.R. to make Radio contacts will receive Central Radio Club metals. Amateurs contacting ten different stations this year will receive a certificate of the Radio Sport Federation and the Central Radio Club. For 25 contacts, a certificate of Radio magazine will be issued. Those completing 100 QSO's will receive autographed photos of the constructors of the on-board equipment. Repeat QSO's are permitted comprising up to fifty percent of the total, provided different orbits are used. Special versions of the existing R-10-R, R-15-R, R-100-O and W-100-U awards will be issued for Radio satellite contacts.

SWITCHING ANTENNA POLARIZATION THE EASY WAY

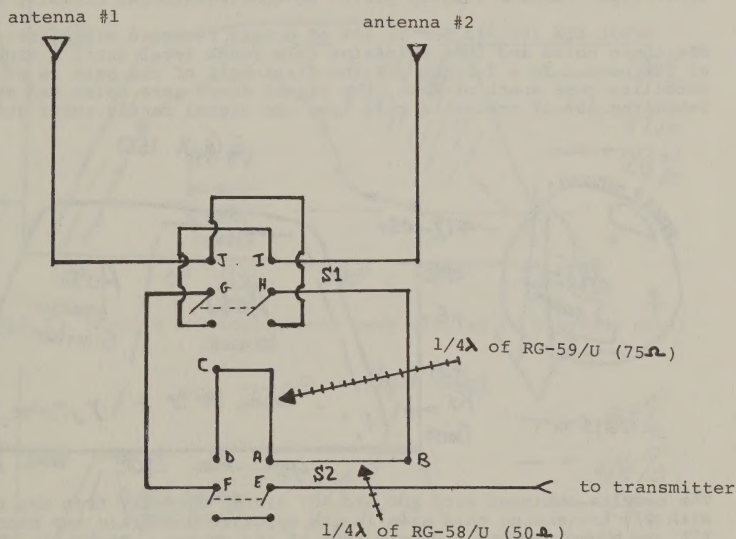
By Ross W. Forbes, WB6GFJ
Manager, AMSAT-OSCAR QSL Bureau
Box 1, Los Altos, CA 94022

The attached is a copy of the schematic of my switching control for 145 MHz. The control allows me to switch from any of the following positions:

1. VERTICAL POLARIZATION
2. HORIZONTAL POLARIZATION
3. RIGHT HAND CIRCULAR
4. LEFT HAND CIRCULAR

Parts required include: 3 - female chassis mount coax connectors
2 - DPDT switches
1 - chassis approx. 6"x6"x6"
about 5 feet of 52 OHM coax
about 5 feet of 72 OHM coax

While the parts I used were not designed for VHF or UHF, I find the control works very well on both transmit and receive. Especially on Mode B, if you've never been able to change receive polarization, you have a wonderful surprise in store. While some stations have designed their control for various degrees of polarization, this simple diagram will provide you with a new element to control fade on Mode B receive. My diagram is a modification of a design provided by John Pronko, W6XN, Northern California AMSAT Coordinator.



Length A to B = $\frac{1}{4}$ -wavelength RG-59/U
Length A to C = $\frac{1}{4}$ -wavelength RG-59/U
Length C to D = $\frac{1}{4}$ -wavelength RG-58/U
Length XMTR to E = Any length of RG-58/U or RG-8/U
Length F to G and B to H are RG-58/U but must be equal
Length I to Antenna 1 and J to Antenna 2 is any length of RG-8/U and must be equal
S1 and S2 are DPDT
 $\frac{1}{4}$ -wavelength velocity factor used is 13.355"

RECEPTION OF 70CM SIGNALS FROM SATELLITES

SUMMARY OF RESULTS MARCH TO OCT. 78

By John Branegan, GM8OXQ

Introduction The launch of OSCAR 8 disappointed many amateur satellite users when its Mode J transponder produced only weak variable downlink signals. For six months the writer has monitored signals from this satellite in an effort to find reasons for this. From time to time this has involved comparisons with 70 cm signals from other satellites notably P76 and OSCAR 7A.

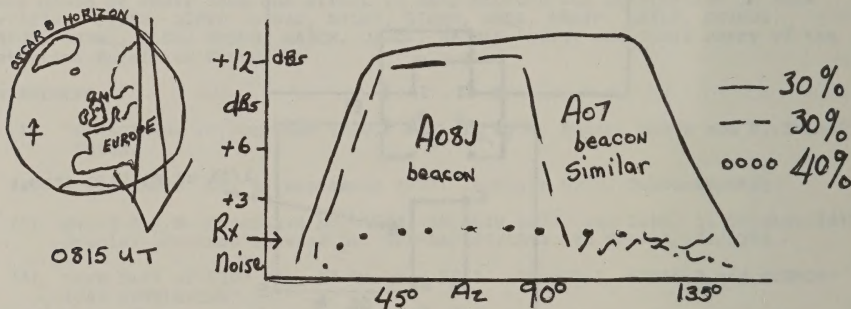
Equipment The receiving system uses a Lunar low noise pre-amplifier, Microwave Modules 435/29 transverter, feeding an FT 101E receiver as I/F and has a measured equivalent noise temperature of 130° K. Antennas used provide 28° beamwidth in elevation and azimuth with provision for switching polarisation in vertical, horizontal and clockwise, anti-clockwise modes. The receiving site is at Saline in Fife Scotland at $56^{\circ}12'N$, $3^{\circ}36'W$ at 110 metres above sea level with horizons generally clear down to 1° El except to the east and north-east where the horizon rises to 3° .

Method The satellites were tracked continuously in azimuth and elevation from beginning to end of each of 150+ orbital passes. Signal levels measured as dBs above receiver noise were recorded every half minute. In addition, brief records of signal levels were recorded for a further 300 orbits used for normal amateur communications.

Results For convenience results are split up into a family of orbit types. Each orbit type covers roughly $\pm 12.5^{\circ}$ of EQX (Equatorial Crossing bearing).

Orbit EQX 160 ± 12.5 In 30% of orbits recorded signal rises quickly to 12 dBs above noise and then maintains this rough level until 1 minute before the end of the pass. In a further 30% the first half of the pass is at 12 dBs but as the satellite goes south of east, the signal drops into noise and stays there. In the remaining 40% of orbits of this type the signal rarely comes above noise.

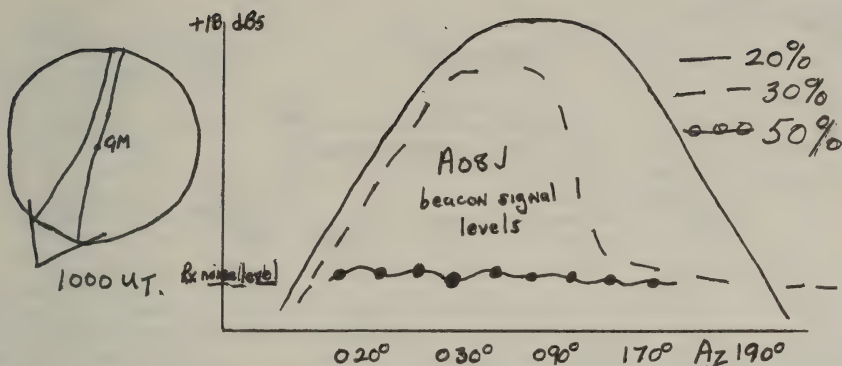
EQ X 160



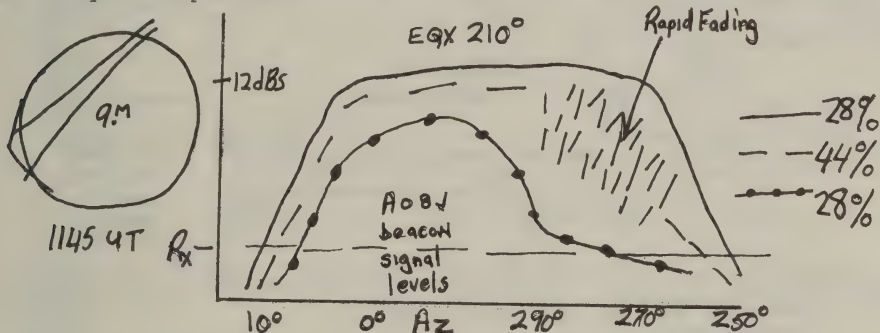
The results obtained with A08 and A07 differ markedly from the results obtained with P76 traversing this area in the opposite direction two hours later in that P76 has strong signals nearly 100% of its passes. Similarly when A08 and A07 traverse this same area the opposite way in the early evening, they show much steadier strong signals. There is no day to day relationship or similarity between EQX 160 A08 passes on successive days.

Conclusions The effects are not weather/atmosphere dependent in that they do not last more than two hours even when the weather is stable for days. The effects do seem to be time of day dependent, perhaps related to the position of the sun. The signal path is clearly more disturbed to the south than the north.

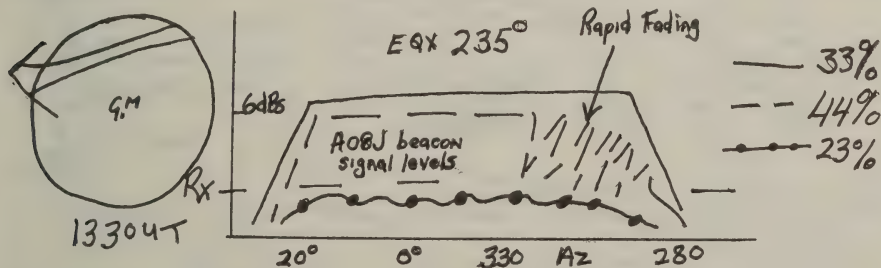
Orbit EQX 185 $\pm 12.5^{\circ}$ Results similar to previous orbit but not as good overall. 20% good strong passes, 30% good to north, poor to south. 50% poor north and south. Signals at peak are higher than previous orbit in agreement with shorter slant range to satellite. Conclusions as for previous orbit.



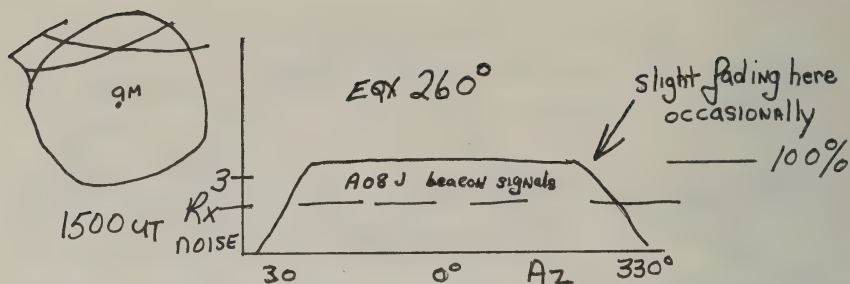
Orbit EQX 210 $\pm 12.5^\circ$ Some improvement over previous orbits in that 28% of passes have good strong signals throughout and a further 40% are strong but subject to fading when satellite is to west north-west azimuth 290°. Even remaining passes are strong to north but fade into noise as satellite travels south. Conclusions are again similar to first two orbits except fading to west north-west appears to occur on most satellite passes through/over this geographical area whatever the time of day of the pass.



Orbit EQX 235 $\pm 12.5^\circ$ Results and Conclusions very similar to previous orbit at EQX 210.

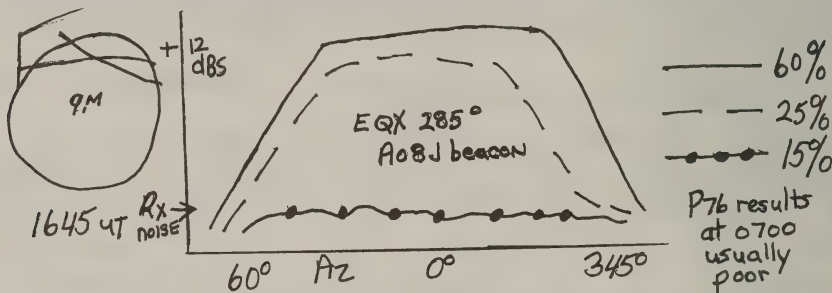


Orbit EQX 260 $\pm 12.5^\circ$ The lowest elevation, highest latitude orbit of the day. The satellite passes well to the north, close to the pole. Signals are very consistent on all orbits examined at 4dB above receiver noise rarely disturbed by fading or flutter.



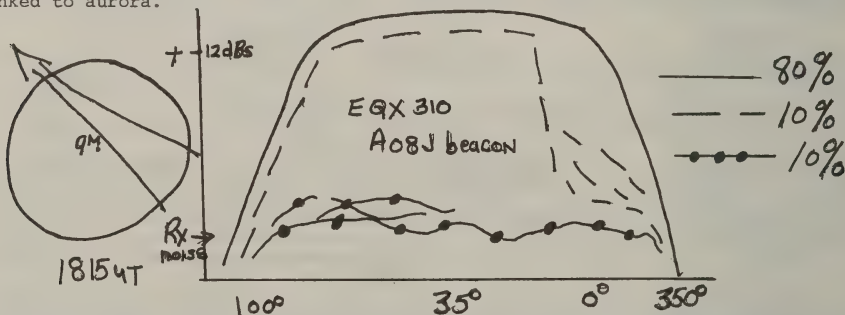
Orbit $285 \pm 12.5^\circ$ More than 60% of these passes are consistently strong throughout. A further 25% have strong signals except to north north-west. Remaining 15% of passes never come out of noise.

Conclusion This orbit and the one which follows it are the most consistent orbits for good signal levels on A08 and A07, but not P76 which traverses this area in the same direction 10 hours earlier often with poor signals.



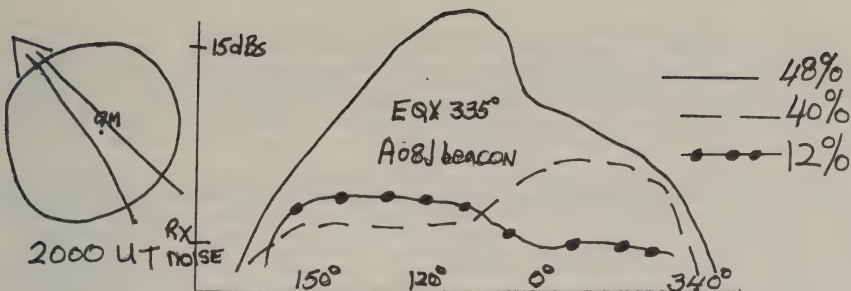
Orbit $310 \pm 12.5^\circ$ 80% strong signals throughout. A further 10% start only 3dB above noise in the east then become weaker. The remainder are strong east and northeast then only 3dB above noise to north.

Conclusions This and previous orbit appear to occur at most suitable time of day and place for consistently good results. Poor results to north can usually be linked to aurora.



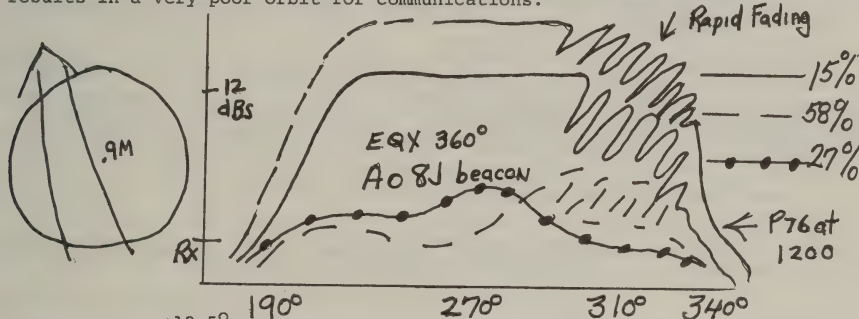
Orbit EQX 335 $\pm 12.5^\circ$ 48% strong throughout; 40% strong north, weak south; 12% strong south, weak north.

Conclusions As satellite moves into lower more southerly latitudes signals are again disturbed. Weak signals to north usually correlate with aurora.

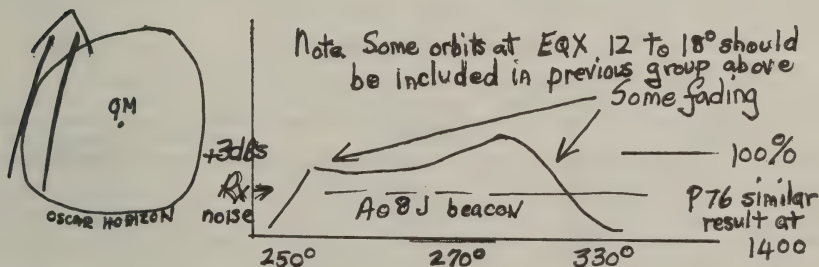


Orbit EQX 360 $+18^{\circ}$
 -12.5° The poorest orbit of the day; only 15% passes produce strong signals. 85% are in noise while satellite is south and, of these, a third stay in the noise to the north while the remaining two thirds come out of noise but suffer severe fading to the north.

Conclusion The coincidence of the satellite's low latitude pass under an evening sun followed by transit of the regularly disturbed area to the north north-west of UK, results in a very poor orbit for communications.



Orbit EQX 25 $+12.5^{\circ}$
 -7.5° Consistently good signals despite low elevation.



Summary

1. The pattern of poor results to the south appears to be linked to the time of day and/or position of the sun. P76 ten hours ahead orbitally gets far less overall disturbance.
2. Good results to northeast also appear to be time of day linked. P76 is not as good ten hours earlier, so it is unlikely to be due to latitude.
3. Pronounced signal fading in area roughly bounded by 55 and 75N, 10 and 30 W happens at all times of day. Fading rates of 2 to 100 cycles per min. suggest high electron density somewhere along line of sight.
4. Rotation of polarization has been searched for many times but only observed twice at the slow rate of 360° in 8 minutes. It may occur in the fast fading. Satellite spin effects on signal have not been noted though spin is clearly evident at 1 rev in 4.4 minutes from solar cell panel telemetry.

I have worked 25 countries with more than a dozen good solid QSOs into W1, W3, VE1, VE2, and VE3. Active stations are few and far between here, but those who do make the grade through the problems of consistent tracking with narrow beam antennas, low noise receiver front ends, receiver desensitizing on transmit, and cross mod product birdies, have a rare experience awaiting them -- a satellite without alligators. One suggestion going the rounds here is that you should make Phase III just as difficult, then we won't get alligator problems there.

However, weak jokes aside, there is one feature of 8J which does give me concern and I think the attached monitoring results show this feature plainly -- i.e., there is very little doubt that the free space loss nomograms, supposedly applicable to satellites, which are a featured item in most of the current handbooks, are a heck of a long way from the truth. For I believe it is evident that the weak signal downlink from 8J frequently has to contend with a very disturbed path from satellite to ground. At the moment, I am in no position to write the definitive monograph on just what produces this disturbance though it seems that at least two sources may be involved:

- (1) The ionosphere - which contrary to much published data, does not suddenly stop acting up as signal frequencies go above 40 MHz.
- (2) The lower edges of the inner Van Allen belt - which may perhaps come down into the OSCAR tracks over certain regions of the world, producing patches of high electron density in parts of specific OSCAR orbits.

These disturbances seem to affect all weak satellite signals I have looked at and are as bad on OSCAR 7A 70 cm beacon, as they are on Mode J. Even the stronger signals from P76 (Stanford Research Inst.) are regularly disturbed, as were the downlink signals from ATS 6 when it could be picked up in Europe on 860 MHz during the Indian SITE TV geostationary satellite experiments a couple of years ago.

I wonder what are the implications for Phase III?

The writer is grateful to DB9AX, DC9II, PE1BIF, PE0TAB, VE3BNO, WA3ZHW and others whose fine signals have kept 8J active for this minor research.

OSCAR SATELLITE INFORMATION SUMMARY (Northern Hemisphere)

MODE	UPLINK			DOWNLINK			BEACON		DOWNLINK OFFSET-kHz
	Freq.	Polar.	Mod.	Freq.	Polar.	Mod.	Freq.	Polar.	
7A	145.85-145.95	LHC	USB	29.4-29.5	L	USB	29.502	L	-
B	432.125-432.175	RHC	USB	145.975-145.925	RHC	LSB	145.972	RHC	-
8A	145.85-145.95	LHC	USB	29.4-29.5	L	USB	29.402	L	-8
J	145.9-146.0	RHC	USB	435.1-435.2	L	LSB	435.095	L	-6
RS	145.88-145.92		USB	29.36-29.40		USB	29.401		

MINUTES OF THE BOARD OF DIRECTORS MEETING, 15 OCT. 1978

A meeting of the AMSAT Board of Directors was held during the morning of 15 Oct. 1978 in the Conference Room of Building #2 of NASA Goddard Space Flight Center, Greenbelt, MD. The following people were in attendance:

John Browning, W6SP
Tom Clark, W3IWI
Martin Davidoff, K2UBC
John Henry, VE2VQ (ex VE2DNM)
Jay Holladay, W6EJJ

Jan King, W3GEY
Perry Klein, W3PK
Martin Sweeting, G3YJO
Will Webster, WB2TNC
Rich Zwirko, K1HTV

Items discussed and action taken were as follows:

1. Proposed Changes to AMSAT Bylaws

a) The Board endorsed a motion to revise the bylaws pertaining to nominating candidates for the board of directors to add the following method for entering nominations -- Candidates for the board of directors may be nominated by obtaining endorsement signatures from five regular voting AMSAT members. Comments on this proposed change are solicited from the membership so that the proposal can be acted on in time for the 1979 elections.

b) The Board also endorsed a motion to allow Board members not in attendance to vote on important issues by telephone. The rationale is that some board members do not live in the metropolitan D.C. area and therefore are unable to attend many meetings due to transportation costs. Before this change is passed the laws of the District of Columbia (AMSAT is incorporated in D.C.) must be checked.

c) It was pointed out that the bylaws have not appeared in the AMSAT Newsletter for a number of years. It was the consensus of the Board that the Newsletter Editor be directed to include the bylaws in an early issue.

2. National Association of Publishers (SNAP) Membership

Perry Klein proposed that, as the publisher of the AMSAT Newsletter, we join the national publishing group known as SNAP and reported that William Dunkerley, WA2INB, had offered to contribute the membership fee. The proposal was accepted by the Board.

3. Amateur Satellite Service Council Items

The text of a draft proposal to ASSC from AMSAT concerning (1) the use of Phase III satellites for W1AW bulletins and traffic handling and (2) a request to ARRL for continuing financial support was informally discussed.

4. SYNCART Project

John Henry discussed the SYNCART transponder under construction by the AMSAT-Canada group. Hardware is progressing on schedule. However, launch status is uncertain due to recent changes in launch plans and priorities of the government and commercial agencies concerned. These changes are being closely monitored.

5. U.K. Scientific-Educational Satellite Proposal

Martin Sweeting, representing AMSAT-UK and the University of Surrey, England, presented a proposal for a Phase II satellite to be constructed and financed by a consortium of British groups. The satellite would differ from previous OSCARS in that it would place greater emphasis on scientific experiments of interest to radio amateurs. AMSAT agreed to endorse the project fully and to assist in identifying a suitable launch in the 1981-1982 time frame.

6. Region I (Europe and Africa) Experiment Coordination and Information Dissemination

In response to a suggestion by Pat Gowen, G3IOR, it was agreed that responsibility for scheduling AMSAT-OSCAR 7 experiments and disseminating OSCAR information to Region I users be turned over to AMSAT-UK.

7. Phase III Travel Funds

Jan King reported that a meeting has been scheduled for Oct. 27, 28 and 29 for those working on critical aspects of Phase III-A flight hardware and ground support systems. Travel funds for this meeting were authorized by the Board.

Jan also reported that the European Space Agency might require the presence of an AMSAT representative for a launch site test in Kourou, French Guiana scheduled for Nov. 20, 1978. Travel funds for one person to attend this meeting, if necessary, were authorized.

8. Proposed AMSAT-OSCAR College Scholarship Program

Will Webster presented a proposal by D.L. Barr Sr. (W9KJU "Sparky") and Keith Mason (W9VI) concerning an AMSAT-OSCAR college scholarship program. The Board responded very favorably to the idea. However, because of the severe shortage of help in the Washington area, personnel here must concentrate on producing flight hardware (i.e., satellites). Therefore, we can't offer much organizational assistance. If Sparky and associates would care to produce a detailed proposal and develop the scholarship program the Board anticipates enthusiastically endorsing it. Any program should, of course, be coordinated with other amateur radio efforts along similar lines (e.g., Foundation for Amateur Radio Scholarship Program) so as to best serve amateur radio and the amateur satellite program.

9. FAR Membership

The Board designated Will Webster as AMSAT Trustee to the Foundation for Amateur Radio (FAR).

10. AMSAT Participation in WARC

The ITU has formally invited AMSAT to attend the 1979 WARC in an observer status (ten weeks beginning Sept. 24, 1979). The possibility of participation was discussed. Items included -- the high cost, who would represent AMSAT, the importance of the WARC on the future of the radio amateur satellite program, etc. No conclusions were reached.

11. Personnel and Office Furniture

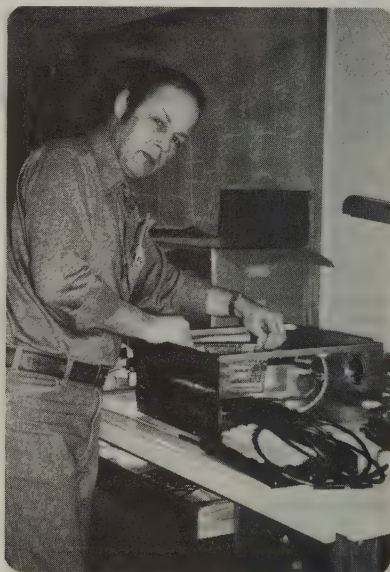
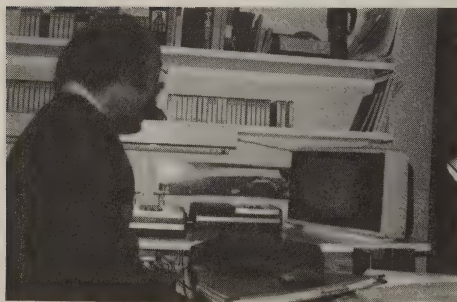
As Phase III-A enters the flight hardware construction stage it becomes necessary to hire technical personnel. The Board approved the hiring of two employees-- Marie Marr (Marie previously worked on OSCARs 6, 7 and 8) and Clarke Greene, K1JX (Clarke worked on OSCAR 8). The Board also authorized the expenditure of \$600 total for furniture at the D.C. AMSAT office (this includes \$300 already spent).

12. Election of Officers for 1978-79

All current officers were reelected.

Ron Dunbar and a prototype
AMSAT-GOLEM 80. Photo G3ZCZ

Karl Meinzer developing
IPS software at his home
Photo G3ZCZ



AMSAT ANNUAL MEETING - 14 OCTOBER 1978

By Art Feller, W4ART

Ninety-one AMSAT members and their guests attended the Annual Meeting held at the Goddard Employees Recreation Center on 14 October 1978. The meeting was chaired by Dr. Tom Clark, W3IWI.

First order of business was a brief review of the past year's activities:

o The OSCAR 8 spacecraft was successfully launched on 5 March 1978. Participating in the effort were AMSAT, ARRL, JAMSAT, AMSAT Deutschland and AMSAT Canada.

o A new laboratory facility was dedicated earlier in the day on the grounds of the Goddard Space Flight Center Visitor Center. NASA has provided the building while AMSAT will endeavor to provide staffing during hours the Goddard Visitor Center is open to the public.

o The AMSAT staff was to be increased by a full time engineer and technician for the Phase III project sometime in November.

o Work on the Phase III spacecraft has proceeded particularly in the following areas: prototype construction, integration with the launch vehicle, the attitude sensor, transponder and the on board computer.

o AMSAT-Canada is in the process of reorganizing. (See additional information later in this article.)

o AMSAT-UK has been acting as an information source for amateurs in Europe and Africa. They are also considering a new package for launch. (See a discussion of this later in this article.)

o Finances were reported: solar cell contributions totalled \$29,000 in 1977 and \$13,500 so far in 1978 for a total of about \$42,500. AMSAT now has about \$112,000 in the bank including Life Member Reserves from approximately 1,000 Life Members.

AMSAT-Canada expects to become a Federal Corporation shortly according to John Henry, VE2VQ (formerly VE2DNM). AMSAT-Canada is also preparing hardware for a geostationary launch opportunity sometime in the early 1980's. John described how a 31 page proposal was prepared between 3 January and 28 March of this year. The first flight qualified hardware is expected to be ready by late 1978. The exact transponder configuration has not been set yet. There are 20 individuals in Canada working on the project, three quarters are licensed amateurs. These twenty have divided themselves into appropriate groups. Project Meetings are held on Monday nights.

AMSAT-UK has been developing the idea of an amateur scientific research satellite according to Martin Sweeting, G3YJO. The project began eight months ago at the University of Surrey. Ideas for appropriate kinds of payloads are solicited. So far, these ideas have been considered: a magnetometer experiment; HF propagation experiments in the 20, 15 and 10 meter bands; beacons on 10 and 24 GHz; various educational ideas; other beacons with extended codestore, slow scan camera for cloud and land photographs. Currently, AMSAT-UK is working from its own material resources. But, ideas are welcome from all quarters. Specific launch opportunities around 1981 are being sought.

Election results for the AMSAT Board of Directors were announced by Dick Cotton W8DX. 252 valid ballots were cast with the results:

Tom Clark, W3IWI	202
Pat Gowan, G3IOR	180
Earl Skelton, N3ES	129
Rich Zwirko, KLHTV	162

Tom, Pat and Rich will serve as Directors with Earl as an alternate.

Phase III progress was reported by Jan King, W3GEY. Vibration tests were begun on 12 October in Toulouse, France. Under test was the technology capsule, a full scale model of the Ariane L02 Payload, including the Phase III engineering test unit. Tests have gone well on what has been considered to be the worst axis for vibration in the spacecraft. The Phase III spacecraft has undergone more vibration testing than OSCAR 6, 7 and 8 combined.

Engineering prototypes of the transponders have been OK'ed except for the final amplifier which is now being tested in Frankfurt.

Two flight quality IF crystal filters have been received from JAMSAT. These filters have a 180 KHz bandwidth.

Jan reported that it may be possible to obtain leftover flight spare parts from the ITOS program. These parts include 10,500 solar cells with cover slips and mounting hardware, 48 Ni-cad cells (worth about \$400 each), and one sun sensor assembly. Final approval was expected soon.

Design of the earth sensor assembly is proceeding in West Germany with some help from the Leitz Corporation.

Dick Jansson, WD4FAB has completed a major thermal design program. Structural design of the Phase III has been completed and has tested out very well.

A high level language for use by ground stations known as Interpreter for Processor Structures (IPS) has been developed to work with English and German mnemonics by DJ4ZC, W0PN, and others. Specific definitions of the work to be done by ground stations are underway in Duluth, Minneapolis and Washington.

No flight hardware is on hand yet in Washington for the Phase III project.

Computer standards have been set up so that anyone working on Phase III and other related projects can be reasonably certain that programs will run on all machines set up according to the AMSAT standard. Check with the standard developers W3IWI, G3CZC/W3 and VE3SAT/W6.

The main problem remaining in the Phase III project, according to Jan, is time. The current schedule calls for a launch on 3 December 1979. As a result, some compromises have been made in the spacecraft design. There will be no S-band beacon since it is not certain that such a beacon will be authorized. A one transponder approach will be used -- 435 to 145 MHz -- but with a 180 kHz passband. We should consider the first Phase III spacecraft to be a prototype for following projects, according to Jan.

In closing, Jan thanked W4FJ for his donation of a scope cart for the laboratory. AMSAT needs donations of chairs, tables, desks and hand tools to be used in the laboratory.

Rich Zwirko, K1HTV reported on operation of AMSAT-OSCAR 7. A spacecraft emergency was declared for the four year old OSCAR 7 last month. Problems first showed up as unscheduled mode switching during the summer. On 4 September OSCAR 7 began losing telemetry - all 0's or all 1's would be transmitted. Apparently one cell from the upper half of the battery has shorted out so that the normal 13 to 14 volt power supply is now delivering about 10 volts. The -10volt regulator which drives the telemetry encoder needs a minimum of about 11 volts to function properly - hence, the problem. The possibility of CMOS degradation is considered to be unlikely as the source of any problems since the circuitry is reasonably well shielded within the spacecraft. For the near future, Rich says that the command stations will endeavor to keep OSCAR 7 on the air. There will be no set schedule. However, Mondays (UTC) will remain as QRP days. Command stations have been instructed as follows: if the satellite falls into Mode D, then switch to Mode A. If the satellite switches into Mode B, then leave it alone.

Bernie Glassmeyer, W9KDR reported from the ARRL on the operation of OSCAR 8. All in all -- very smooth. The spacecraft is operating within normal tolerances in all respects.

On other matters from the ARRL, a slide show about OSCAR 8 is now available from the League. A phonograph record has been prepared for inclusion as a pullout in "Current Science" magazine. This magazine is an educational publication for junior high schools. The record is designed to provide a general introduction to the OSCAR satellites. 500,000 copies of the record have been distributed to about 30,000 schools. It has been estimated that the record will be heard by some 2 million students. Copies of the record may still be available from Xerox Educational Publications in Middletown, CT.

A 10-meter version of the IARU receiver has been made for receiving the Mode A transponders. This is a direct conversion receiver which can be made for about \$25 a copy.

A "Mode J Club" has been suggested by some at League Headquarters to stimulate interest in Mode J operation. The operation might be fashioned after SMIRK now functioning on 6-meters. Larry Roberts, W9MXX, has volunteered to handle certificates.

Newsletter editor, Joe Kasser, G3ZCZ, mentioned that he needs material for the Newsletter. Virtually everything submitted gets printed. The better the material submitted -- the better the Newsletter.

An open forum conducted by Tom Clark, W3IWI, followed the reports. To open the discussion, Tom read a letter from K4KQ which appeared in the September issue of the AMSAT Newsletter. The principal subject was communication between AMSAT and AMSAT members. A summary of comments follows:

o K1HTV (Vice-President, Operations) suggested that area coordinators try to get to know the satellite operators in their areas better.

o W6SP suggested that better use be made of the various nets.

o K9PVW thought that lists of operators in each area would be useful for the area coordinators. Area coordinators should also make a better effort to attend local hamfests. 2-meter SSB nets have proven to be helpful in KO's area. N9RD runs an AMSAT net on a repeater in the Chicago area.

o K4EVH pointed out that Mode A type transponders are the "feeder mode" to keep new people coming into the OSCAR programs. Setting up is low cost and the transition from HF operation to satellite operation is easier to Mode A than any other mode.

o WB2TNC said that if we want funds to produce satellites, AMSAT had better pay attention to settling the problems of people who supply the money. K4KQ's sentiments are shared by many people who check into the nets. The money comes from donations and dues.

o K2ZRO discussed briefly problems with the AMSAT QSL bureau. He suggested that users send extra stamps and money to help expedite handling of cards with no envelopes.

o W3IWI said that he would be proposing a change in the method used to nominate candidates for the AMSAT Board of Directors. He will suggest that a petition of 5 full members be acceptable for nominating candidates in addition to nominations from member societies.

o W3XO said that we should make more extensive use of the KISS system ("keep it simple, stupid"). Some people are overwhelmed by all the things one needs to know to use the amateur satellites. Key people should make a point of spending time on the air for questions and discussions.

o WB2LEI noted that only a few people in the AMSAT organization do the work, a small number give unfavorable criticism and most are complacent. We should not be concerned. Information can be obtained with only a 75-meter receiver. People have to ask for information which is readily available.

o W3GEY felt that we should maintain a core of up to about 10 people perhaps with another core group working on another project. The current main group is trying to achieve the best possible communications satellite and to challenge the users to advance the communications art.

o G3ZCZ mentioned the Newsletter -- more input will yield more Newsletter. Is the Newsletter being read? Joe also mentioned the idea of ground based interfaces to future amateur satellites so that equipment now normally used for terrestrial communications might be used with orbiting transponders. On nets, Joe asked whether the current schedule for Wednesdays UTC was the most convenient for everyone.

Other general comments were directed from the floor. One noted that the 75-meter nets are conducted on 3850 kHz - in the advanced band segment, thus limiting the number of people who can check in. W3IWI suggested that the nets were primarily used for the outflow of information so the band segment is not important. That point of view was challenged by several who thought that participation should be considered equally as important. Others mentioned that the QRM level in the general segment would be too high to conduct the net.

The subject of satellite official observers was brought up briefly. Some criticized the idea as "big brotherism". It was pointed out that IARU Region 1 recently adopted a resolution recommending that the member national societies implement OO programs.

Finally, K1HTV suggested that a channel be set aside near each beacon frequency to be used for ground information nets.

The meeting was adjourned in favor of a more relaxed and informal breeze-shooting session.

REFERENCE ORBITS

1979

RS-1

AMSAT-OSCAR 8

Ref Orbit	Date	Time (UTC)	Long W	Ref Orbit	Date	Time (UTC)	Long W
1051	22 JAN	0126	26.3	4496A	22 JAN	0041	52.7
1063	23 JAN	0131	29.0	4510A	23 JAN	0046	54.1
1075	24 JAN	0136	31.8	4524X	24 JAN	0051	55.4
1087	25 JAN	0140	34.5	4538A	25 JAN	0057	56.7
1099	26 JAN	0145	37.2	4552A	26 JAN	0102	58.0
1111	27 JAN	0150	39.9	4566J	27 JAN	0107	59.3
1123	28 JAN	0154	42.7	4580J	28 JAN	0112	60.6
1135	29 JAN	0159	45.4	4594A	29 JAN	0117	62.0
1146	30 JAN	0003	17.9	4608A	30 JAN	0123	63.3
1158	31 JAN	0008	20.6	4622X	31 JAN	0128	64.6
1170	1 FEB	0013	23.3	4636A	1 FEB	0133	65.9
1182	2 FEB	0017	26.0	4650A	2 FEB	0138	67.2
1194	3 FEB	0022	28.8	4663J	3 FEB	0000	42.7
1206	4 FEB	0027	31.5	4677J	4 FEB	0005	44.0
1218	5 FEB	0031	34.2	4691A	5 FEB	0011	45.4
1230	6 FEB	0036	36.9	4705A	6 FEB	0016	46.7
1242	7 FEB	0041	39.6	4719X	7 FEB	0021	48.0
1254	8 FEB	0045	42.4	4733A	8 FEB	0026	49.3
1266	9 FEB	0050	45.1	4747A	9 FEB	0032	50.6
1278	10 FEB	0055	47.8	4761J	10 FEB	0037	51.9
1290	11 FEB	0059	50.5	4775J	11 FEB	0042	53.3
1302	12 FEB	0104	53.2	4789A	12 FEB	0047	54.6
1314	13 FEB	0109	56.0	4803A	13 FEB	0052	55.9
1326	14 FEB	0113	58.7	4817X	14 FEB	0058	57.2
1338	15 FEB	0118	61.4	4831A	15 FEB	0103	58.5
1350	16 FEB	0123	64.1	4845A	16 FEB	0108	59.8
1362	17 FEB	0127	66.9	4859J	17 FEB	0113	61.1
1374	18 FEB	0132	69.6	4873J	18 FEB	0118	62.5
1386	19 FEB	0137	72.3	4887A	19 FEB	0124	63.8
1398	20 FEB	0141	75.0	4901A	20 FEB	0129	65.1
1410	21 FEB	0146	77.7	4915X	21 FEB	0134	66.4
1422	22 FEB	0151	80.5	4929A	22 FEB	0139	67.7
1434	23 FEB	0155	83.2	4942A	23 FEB	0001	43.2
1446	24 FEB	0200	85.9	4956J	24 FEB	0006	44.5
1457	25 FEB	0004	58.4	4970J	25 FEB	0012	45.9
1469	26 FEB	0009	61.1	4984A	26 FEB	0017	47.2
1481	27 FEB	0014	63.8	4998A	27 FEB	0022	48.5
1493	28 FEB	0018	66.6	5012X	28 FEB	0027	49.8
1505	1 MAR	0023	69.3	5026A	1 MAR	0032	51.1
1517	2 MAR	0028	72.0	5040A	2 MAR	0038	52.4
1529	3 MAR	0032	74.7	5054J	3 MAR	0043	53.7
1541	4 MAR	0037	77.5	5068J	4 MAR	0048	55.1
1553	5 MAR	0042	80.2	5082A	5 MAR	0053	56.4
1565	6 MAR	0047	82.9	5096A	6 MAR	0058	57.7
1577	7 MAR	0051	85.6	5110X	7 MAR	0103	59.0
1589	8 MAR	0056	88.3	5124A	8 MAR	0109	60.3
1601	9 MAR	0101	91.1	5138A	9 MAR	0114	61.6
1613	10 MAR	0105	93.8	5152J	10 MAR	0119	62.9
1625	11 MAR	0110	96.5	5166J	11 MAR	0124	64.2
1637	12 MAR	0115	99.2	5180A	12 MAR	0129	65.6
1649	13 MAR	0119	102.0	5194A	13 MAR	0135	66.9
1661	14 MAR	0124	104.7	5208X	14 MAR	0140	68.2
1673	15 MAR	0129	107.4	5221A	15 MAR	0002	43.7
1685	16 MAR	0133	110.1	5235A	16 MAR	0007	45.0
1697	17 MAR	0138	112.8	5249J	17 MAR	0012	46.3
1709	18 MAR	0143	115.6	5263J	18 MAR	0017	47.6
1721	19 MAR	0147	118.3	5277A	19 MAR	0023	49.0
1733	20 MAR	0152	121.0	5291A	20 MAR	0028	50.3
1745	21 MAR	0157	123.7	5305X	21 MAR	0033	51.6
1756	22 MAR	0001	96.2	5319A	22 MAR	0038	52.9
1768	23 MAR	0006	98.9	5333A	23 MAR	0043	54.2
1780	24 MAR	0010	101.7	5347J	24 MAR	0049	55.5
1792	25 MAR	0015	104.4	5361J	25 MAR	0054	56.8
1804	26 MAR	0020	107.1	5375A	26 MAR	0059	58.1
1816	27 MAR	0024	109.8	5389A	27 MAR	0104	59.5
1828	28 MAR	0029	112.5	5403X	28 MAR	0109	60.8
1840	29 MAR	0034	115.3	5417A	29 MAR	0115	62.1
1852	30 MAR	0038	118.0	5431A	30 MAR	0120	63.4
1864	31 MAR	0043	120.7	5445J	31 MAR	0125	64.7
1876	1 APR	0048	123.4	5459J	1 APR	0130	66.0

SATELLITE AND ORBIT DETAILS

	<u>OSCAR 7</u>	<u>OSCAR 8</u>
frequencies	Mode A: 145.85-.95 up, 29.4-.5 down, beacon 29.502 MHz Mode B: 432.125-.175 up, 145.975-.925 down, beacon 145.972 MHz	Mode A: 145.85-.95 up, 29.4-.5 down, beacon 29.400 MHz Mode J: 145.9-146.0 up, 435.2-435.1 down, beacon 435.090 MHz
period and longitude progression	Jan: 114.944877 minutes 28.737528 ⁰ Feb: 114.944867 28.737550 Mar: 114.944858 28.737571 Apr: 114.944846 28.737598 May: 114.944836 28.737620 Jun: 114.944826 28.737642 Jul: 114.944814 28.737668 Aug: 114.944805 28.737690 Sep: 114.944795 28.737712 Oct: 114.944783 28.737739 Nov: 114.944773 28.737760 Dec: 114.944764 28.737782	103.229086 minutes 25.808287 ⁰ 103.228656 25.808204 103.228227 25.808120 103.227689 25.808015 103.227260 25.807932 103.226830 25.807848 103.226293 25.807744 103.225862 25.807660 103.225433 25.807577 103.224896 25.807472 103.224466 25.807389 103.224036 25.807305

AMSAT-OSCAR 7 AND 8 ORBITAL DATA CALENDAR NOW AVAILABLE

In cooperation with AMSAT, Skip Reymann, W6PAJ, has again produced an AMSAT-OSCAR ORBITAL PREDICTIONS calendar containing all orbits of the AMSAT-OSCAR 7 and 8 satellites for 1979.

The orbital calendar is available to members postpaid for \$3.00 U.S. funds or 20 IRC's and free on request to AMSAT Life Members. Overseas orders are air-mailed.

From outside the U.S., payment may be made by international postal money order, or by checks made out in U.S. funds, or by U.S. currency. Send orders to AMSAT or to:

Skip Reymann, W6PAJ
P.O. Box 374
San Dimas, CA 91773 U.S.A.

Orders may also be charged to VISA or Master Charge. (Be sure to provide your account number and expiration date on your charge card).

Important - To speed up handling of your order, please include a gummed, self-addressed label.

Proceeds from the orbital calendar benefit AMSAT.

Letters AND Comments

INT.
7878

Dear Joe,

First, I would like to compliment you on a fine publication. I thoroughly enjoy all of it (can't read French tho).

However, I take exception to your comment - "It is too late to make any changes...Phase III...", that sounds exactly as if it came from our U.S. Congress, i.e., "If we have this money committed and available, let's spend it!"

Within the last month, I have decided that I am not going to invest in a satellite station. My reasoning is the same reason that I don't operate much 20 m.SSB. That is that there are too many amateurs who simply cannot operate with low power.

It appears to me that Phase III is headed for obsolescence about one week after launch unless some sort of AGC or other signal control is employed. I do not have the technical ability to know what is best, but lead-time be damned. If the machine won't work, why build it?

At my QTH, I do not have VHF capabilities and have found that Mode A is simply not usable for reception with nominal station and antenna. I have completely stopped trying to listen on 10 m. because I know now that I'm wasting my time.

I will, however, eagerly await and read each copy of the Newsletter. Sincere good luck in whatever you decide to do.

73,

Bill Bechtold
NØWB, IM-642

P.S. I am not enclosing my ballot because all of the nominees are presently managing AMSAT and I think that is a poor recommendation.

Dear Joe:

I would like to suggest that an article be printed in the Newsletter explaining what AMSAT is, and who everyone is that is in charge at AMSAT. There must be enough new members in AMSAT who would appreciate knowing more about our organization. Also, I wonder how many members are aware of how few AMSAT employees are actually paid employees. It is very easy for us to believe that because QST, 73, Ham Radio, the ARRL, etc. are paid employees, that the same applies to AMSAT.

Probably most satellite users would be surprised to know that most of us volunteer our time for free.

73,

Ross W. Forbes
WB6GFJ

(If it is written, it will be published -- Joe)



Dear Perry:

I have just received my Sept. issue of AMSAT Newsletter and read the letter sent in by Charles Bolwin, K4KQ.

He raises several points which I feel deserve a prompt and public answer, preferably in the next issue of the AMSAT Newsletter. In particular, the points regarding experimental days and results of these experiments and the A-0-8 Mode J on both weekend days is most important.

I sincerely hope to see a prompt answer to all AMSAT members.

73s

Kenneth Price
XE1TIS



June 30, 1978

Dear Joe:

I know that you are a good friend of Pat G3IOR, just as I am so thought you'd like to see what Pat sent me with regards to my making DXCC via Oscar.

He assures me that he, and not Norma, originated this little poem and I think it's very clever.

If you wish to put it in the AMSAT Newsletter please feel free to do so. '73

Ben Stevenson w2BXA



Many orbits now have passed since OSCAR has begun some time's gone by since you and I knew that it COULD be done

For countless times we've listened for each other on the bands to air our views and pass the news of rare and needed lands

And now at last you have the proof, One Hundred cards received! and that award is your reward for all you have achieved!

Congratulations, Ben, old Friend, the first station to be the number one, by having won OSCAR DXCC!

*Well done Ben!
I know only too well what
a struggle it has been, but
you made it!*
73 Pat



Only a few words to salute you from Puerto Rico.

Recently, I became member of AMSAT. Days ago, I received AMSAT Newsletter. Members were invited by you to comment in relation to the problem of cost in postage.

I understand perfectly the problem. However, in my personal opinion, I think the AMSAT members have to assume responsibilities and protect our organization in any matters affecting our membership, etc. Is fair enough, that if the postage cost go higher, that AMSAT membership go higher too.

In relation that the postage bill be better spent for Phase III spacecraft, the idea is good, but not practical in public relations. We need the support of our members and they should receive our Newsletter via air mail. But as member of AMSAT, we have to face the responsibilities to pay for that service if the postage cost goes higher. All members of AMSAT are a working team for the benefits of its membership present and future. So, we need the cooperation and understanding of all members in the problem of postage cost.

With my best wishes, I am

Sincerely,

Carlos F. Gutierrez, KP4AA

Dear Joe,

I have made a C-60 cassette tape of AMSAT-OSCAR 8 launch day activities containing edited tapes of WA3NAN and a bit of W1AW on launch day, including launch prep, launch, tracking, orbital insertion, telemetry reports, and then the evening AMSAT net, with WA3NAN, K1HTV, VE3SAT, etc., and the decision to deploy, the SAT patch of the deploy command, replay of his tape and W9 tape of deploy, and the SAT phone patch of the 10M ON beacon command. This is not a "professional" tape, but the audio quality is fair, and anyone interested can obtain one from me for \$2.75. This includes \$2.34 for my expenses and the rest for my trouble. If I get a large response, the cost to me may be reduced a bit and if profits amount to very much, will send some to AMSAT. The price includes first class postpaid mailing. The address is:
Ham Data Systems
PO Drawer DX
Colby, KS 67701

73,

Bruce J. Frahm, KØBJ

AMSAT,

I joined your organization at this year's Dayton Hamfest. I am interested in the AMSAT-80 Computer Project. Any information that you can send to me, such as which Newsletter back issues have info., would be appreciated.

William Goodwin, WB8BER

(Send an sase for the latest update. All Newsletters since Sept. 1977 are of interest. See Byte Magazine, Nov. 1978 as well. - Joe)

BY AIR MAIL
PAR AVION
हवाई डाक से

Dear Joe,

As a service to those who are calculating their own satellite data, I suggest that you in each number of the Newsletter publish orbital data for our OSCARs together with one reference orbit with high accuracy so it can be used for long term predictions. Remember also that lots of members won't or can't buy the orbit calendar. If the correction notice on page 22 of issue No. 3 had been completed with orbital data, it would have been much more valuable. At times when the conditions in the 20 meter band are bad, it is almost impossible to get the ARRL bulletins through! This has been the situation in my shack for a long period now.

So please let the next issue of the Newsletter contain the information requested.

73, Lennart Arndtsson
SM5CJF, Sweden



Dear Joe:

Certainly glad we have you with those broad shoulders to cry on. In brief, I more than say "AMEN" to Chuck's letter (K4KQ), Pat's (G3IOR) and many other similar ones in the Newsletter. Perhaps you can in Dec. issue give us an answer to WHY there has been very little indication of positive action resulting from these member comments.

Being a retired old man trying to keep going on Social Security and my past laurels, I cannot make the coming Board of Directors Meeting. PLEASE DO stand up for me, and in fact, many dedicated OSCAR users and get some positive results for us. Let's not wait for another "Farewell Old Friend" before stopping the misuse of OSCAR and FURTHER, let's scrub Phase III until IT CANNOT HAPPEN AGAIN. One more death of the OSCARS and AMSAT's backing is not going to be worth as much as an old wooden nick.

Oh yes--also, WHY cannot members petition for Directors? Under present bylaws as I understand, nominations are not open to the members. So perhaps that is why so few in the past have VOTED!

73's

Lowell G. Croysdale
W5UCY, LM-33

P.S. Have talked to lots of members on the air and via long distance about many of these questions. There is a great big question mark all around. Now of all times, ARRL's rejection not withstanding, we need "OO" and bulletins every OSCAR pass plus facts via W1AW bulletins which are a lot of ARRL propaganda for our present misfit OSCAR 8. There are plenty of other QCWA and OOTC members using OSCAR to cover every pass without putting the great burden on men like W1NU, W6CG, K1HTV, etc. One more addition, for your information, like many former demonstrators for the last year I've stopped demonstrations having had OSCAR let me down at two last fall. Trying now for another success story at the Eighth Annual Explorer Air Show-- Will and the others have all the dope.

Dear Joe:

Acquisition Coincidence printouts described by N5KR in the Sept. Newsletter are undoubtedly the most accurate way to determine what orbits will permit contact with a specific DX location. A very good approximation is possible with any pocket calculator that will perform trigonometric functions, however, for those willing to take the time. A programmable model helps, of course.

Consider two locations A and B as shown in Fig. 1, with overlapping circles of acquisition. Any orbit passing through the area of overlap should permit the two stations to communicate. A good indication of the orbits of interest can be found by calculating the equatorial crossing longitude of the orbits that would pass through points P and Q or X and Y; which pair applies depends on whether the line AB is more nearly East-West or North-South. Once the limiting equator crossing points are established, any of the programs that give time, azimuth, and elevation can be used to work out the data for the desired schedule.

My program for the Texas Instruments TI-59 is in two parts -- 690 program steps to establish the limits, and 573 to calculate the tracking data from a reference orbit. A sample of the result is enclosed. If anyone wants the programs they can have the complete package in return for a check -- \$8.00 payable to me, or \$15.00 made out to AMSAT.

73,

Pat Shreve
W8GRG

Note: Running time on the TI59 is less than 10 minutes for each pair of cities A and B.

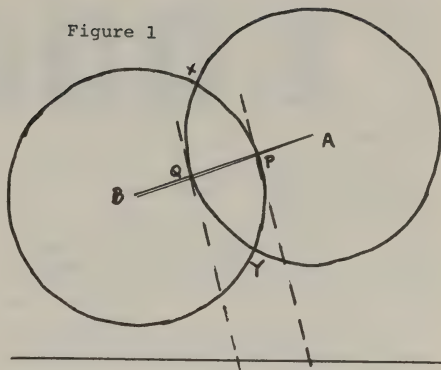
WASHINGTON
Lat. 38.83 A
Long. 77.08

CHICAGO
Latitude 41.83 B
Longitude 87.75

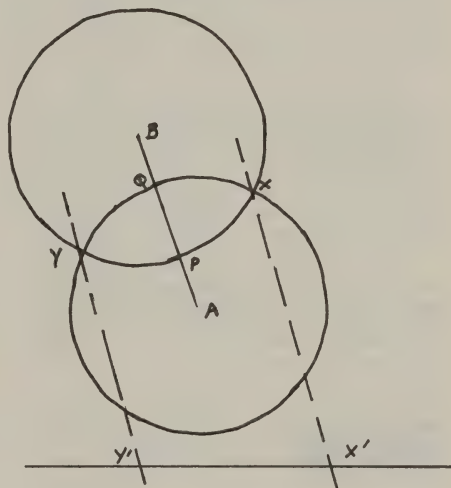
Distance 8.66 AB
Azimuth 293.65 AZ

Limits { 48.72 East } north-
 { 103.15 West } bound
 { 230.08 East } South-
 { 294.88 West } bound

Figure 1



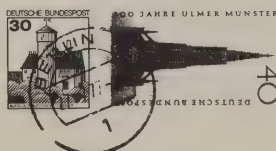
- a) Line AB basically East-West.
Points P and Q establish limits



- b) Line AB basically North-South

Points X and Y establish limits

X' and Y', points where orbits through X and Y cross equator





Dear Joe,

I read with great interest the article Is This The Future? in the Sept. issue of the newsletter.

I understand there are a number of problems facing satellite operation in the near future and I for one am not capable of solving them at the present time.

Your "Gateway" idea seems to follow rather closely along the path of another innovation where signals are transmitted from one end of the country to the other via microwaves with people on both ends sitting in the comfort of their living rooms talking to each other. They called it the LONG DISTANCE TELEPHONE CALL. Now, the only difference being people using the phone usually know each other. Notice I didn't mention the call as costing money being a difference because the "Gateway" stations would also cost money.

There is one item the article did not mention, that being the eroding of the element of creation and experimentation this would bring about which to me is what amateur radio is about. The "Gateway" stations are nothing more than what is already in use on 2 meters namely repeaters. There is nothing challenging about accessing a repeater.

If the "Gateway" idea would come to pass and be put into use, the biggest contribution I could make would be to put all my gear on the market and try to stimulate the economy and buy new curtains for the house.

73's

Dave Kushman
WA8CEU



Dear Joe,

Your commentary in the Sept. Newsletter titled "Is This the Future?" was interesting, but I find highly undesirable.

Yes, it's true that AMSAT may possibly be straddled with little or no more spectrum space for planned future projects. But, considering your alternative, the possibility of using earth stations for accessing a satellite via a hand held unit or what have you, defeats the purpose and value of AMSAT. Also, in conjunction with this, it would curtail the activities of those amateurs learning to communicate via outer space.

You yourself said that such an operation of satellite usage as we do it now requires "skill" and that it is "more complex" than the typical HF setup. Leaving the technical work to a select few to run the earth "gateway" stations doesn't help those who want to increase their technical and operating skill. We've got to try to keep moving forward no matter what obstacles confront us. As far as I'm concerned, "gateway" earth stations is not a step forward.

While the alternatives to anything else are almost non-existent, we can possibly learn to live with the present situation with a few changes.

One possible answer overlooked is the launching of the space shuttle within the next two years. With regular access to orbiting craft via the space shuttle, anything new or innovative in design could be put into orbit in much less time. In fact, it's even possible that some of our satellites could even be recycled, thus saving us much time and money. Consider the possibility of the space shuttle launching in orbit a new satellite, while at the same time plucking say OSCAR 6 or 7 out of orbit for a battery replacement or circuit change.

Of course, this doesn't give us any new frequencies, but maybe the combination of the "gateway" plus the recycled satellite systems could lighten the load a bit.

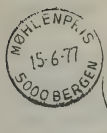
After all, it also wouldn't be fair to eliminate those in the rural areas use of the satellites, while amateurs in the major cities would have daily access to the spacecraft through their local earth station.

And the idea of taking the earth stations out to the country occasionally to serve those out there would still be insufficient because there will always be those somewhere who won't be close enough to work into the station.

Continuing daily access to orbiting satellites would still help serve everybody who's interested.

Sincerely and 73's

J. Craig Caston, AA6PY



Dear Joe:

In view of the recent criticism of AMSAT and the Board of Directors, it seems important to emphasize what AMSAT has done for ham radio, rather than what they have not done and to point out that those dissenting may not be in the majority.

The AMSAT Board of Directors and others involved in the AMSAT organization on a volunteer basis have excelled in their unselfish work in providing the average ham with a means of satellite communications. My first OSCAR contact was with a 25 year old receiver with a ten meter OSCAR bandspread of one eighth of an inch and a home brew 5 watt transmitter.

The Board of Directors have had to make many important decisions and in retrospect nearly all have proven to have been the correct ones.

W3PK has an AMSAT telephone in his home so that he can answer questions and complaints, on his own time, concerning OSCAR. He has done an outstanding job in Administration as well as his design work, testing and assisting in the launch of the OSCARs.

W3IWI has compiled the necessary statistics to present OSCAR 6 and 7 orbital predictions that are less than a minute off after a year, and he will soon provide us with the same reliable data for OSCAR 8. He has worked hard with the fund raising projects which allows AMSAT to plan for the future. He has also made many personal appearances at ham conventions to explain the use of the satellites to the average ham.

W3GEY, in addition to his design, construction, testing and assisting in the launch of the OSCARs, has devoted many hours to his OSCAR articles which were published in QST. He has also made many personal appearances explaining present and future satellites to those interested.

K1HTV has organized and kept the AMSAT Area Coordinators informed about OSCAR and has spent much of his free time in assuring OSCAR will be operating

properly. The AMSAT Area Coordinators have worked hard at no small amount of time and expense to inform us about OSCAR.

WB2TNC has capably handled the Tuesday night and Sunday AMSAT nets for some time, giving out the bulletins to OSCAR users and accepting complaints. He has also made personal appearances promoting OSCAR.

G3IOR represented AMSAT at the IARU Conference this year and has been consistently an excellent OSCAR user. He has contacted over 100 countries via the satellite.

G3ZCZ with help from W3HUC has put together an informative, interesting and Award winning Newsletter which we receive 4 times a year.

VE3SAT spent nearly 6 years in time consuming commanding and care of OSCAR 6, 7 and 8. He has always been willing to listen to and answer questions concerning commanding and telemetry.

W6CG and W6ELT did a fine job in assisting in the commanding of OSCAR 6.

WA4DGU helped build, test and assist in the launch of the OSCARs and he and WØLER have furnished AMSAT with telemetry reports for nearly 6 years.

W1NU and W3BWU have faithfully broadcast bulletins via the satellites for some time.

WØCY has done an excellent job with the Mid Continent net as have W6CG and W6DOW with the West Coast net.

N3ES has carefully inspected the QSL cards sent in for awards and made the awards to those qualifying. WB5MPU and N4QQ have sent out certificates to those making donations.

AMSAT has provided the hams with satellites which have been used effectively for millions of QSOs and offers 3 operating achievement awards. The OSCAR Award, the Sexagesimal Award and the Century Award, to encourage users to improve their operating technique and knowledge. The ARRL also offers 3 awards. The Satellite DX Award, W.A.S. Award and the Satellite DXCC Award. W2BXA recently received Satellite DXCC Award Number 1.

W2GN was recently honored for 5 years of coordinating Educational bulletins. WB1EYI of the ARRL in cooperation with AMSAT has provided information and printed material for

hundreds of OSCAR demonstrations in our schools. W9KJU has proposed an AMSAT sponsored scholarship for a deserving high school student.

Remember this has been all volunteer work with no pay. It takes a dedicated person to take the job and I give them my vote of THANKS and wholehearted support.

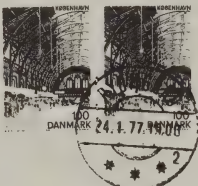
The above hardly points to an organization which is trying to limit the number of OSCAR users, but just the opposite.

I am in favor of Mode B, 2 out of 3 days, because OSCAR 7 B is accessible with lower power and local line noise is less on 2 meters. Some users have suggested all Mode B operation because of the better transponder on B.

The difficulty in commanding OSCAR 7 after the recent lightning strike at VE3HNR indicates that another command station would be beneficial. It should be in the deep Southeastern part of the USA or possibly in the Virgin Islands for early access. The problem is to find a responsible volunteer capable and willing to devote countless hours to commanding year after year.

73,

Keith Mason, W9VI



Dear Joe, G3ZCZ:

My copy of the Newsletter has yet to arrive but I always enjoy reading it when it does arrive.

I've been an AMSAT member for several years and a Life Member for a couple years. I enjoy the letters and comments section and wish to help those who complain about not hearing KH6's on OSCAR.

May I help those who need Hawaii.

OSCAR users needing Hawaii should look for me crystal controlled on 432.142 CW only. I try to make all 108 degree passes for Western USA DX. I will also make CW or SSB skeds for Mode A and soon on Mode J-- An SASE to my address will bring details. Those using N5KR's "Acquisition Coincidence for OSCAR 6, 7 or 8" should know that KH6BZF is located at 21 degrees 25 North (21.407500) and 157 degrees 48 west (157.820000). Write for a sked today to reduce grumbling.

I hope that helps one and all. Keep up the good work and don't let the AMSAT program sag. Dedicated people are out there counting on good management direction. Don't let us down.

Warm alohas, and make sure AMSAT'ers that come to Honolulu contact me and let us know you're in town and eyeball confirmed. Anyone interested in working OSCAR's from my Qth remember to contact me here, just outside Honolulu. Please no late night calls. Agreed?

73's

L. Roger Wical, KH6
"Bloomin' Zipper Flipper"
45-601 Luluku Road
Kane'Ohe, Oahu Hawaii
96744 Oceania



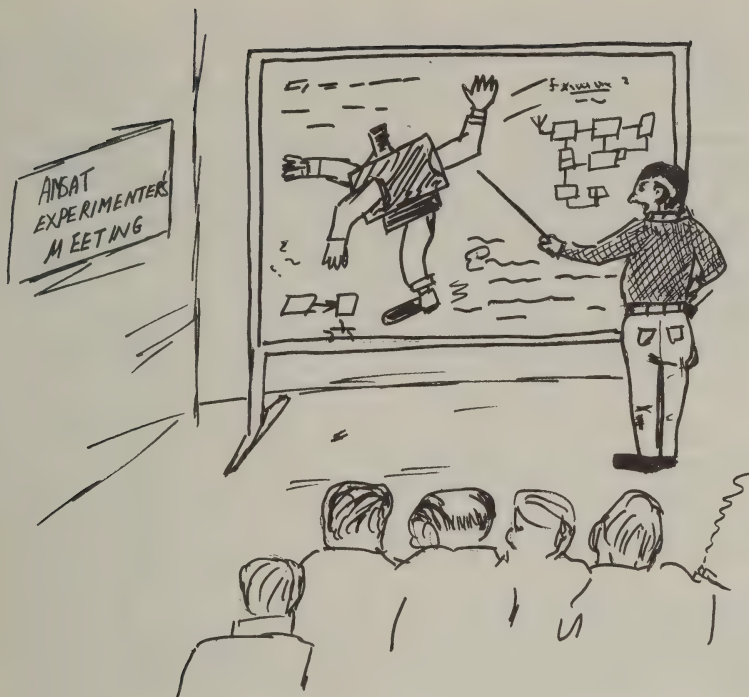
The Signal Generator at KH6BZF

W3PK:

Thank you for your letter informing me that my membership as #1585 has expired, hopefully you still know me as LM-592!!! (at least I'm still on the mailing list)

One point worried me in the June Newsletter that was your proposal to revert to seamail for overseas mail--please don't. The main reason for joining AMSAT was to receive your newsletter---information fresh from the horses mouth---contribution to the space program was secondary. I suspect many members would agree. To receive the newsletter 2 months after it is published is pointless.

I note also that at last I can charge contributions to AMSAT to my credit card, thank you. This saves me applying to the Bank of England to send money overseas, which means a one month delay in getting (automatic) permission and \$3.00 in fees.



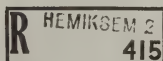
"THE NEW PHASE III DESIGN HAS THREE ARMS
AND A KICK MOTOR — !"

So in order to get my newsletter on time and to help Phase III, please charge \$50 to my credit card.



73,

Robert B. Geddis
G8GGI



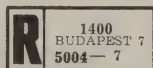
Dear Joe:

I've thoroughly enjoyed my membership in AMSAT this past year and the nuggets in the Newsletter. I didn't start getting acquainted with OSCAR, except for listening, until this summer and I'll tell you I got as big a thrill out of my first OSCAR contact last July as I did out of my first crosstown wireless contact with a Ford coil powered spark gap back in about 1919.

I had decided that I wanted to help the program by becoming a Life Member -- and then the cold water. The suggestion in Sept. Newsletter that "gateway" stations handle all up-link signals. Well, out here in the sticks that is no good. It would eliminate my participation and that of many others like me. I'm 75 miles from the nearest town of any size (7,000 people) and Dubois is only about 1,000 with one ham - me.

However, I believe in the good sense of you people who have designed and flown the birds so successfully and am sure that an alternative and better solution to the uplink power problem will be worked out. So here's my check for a life membership.

The suggestions of K3PNL in the "Letters" in Sept. seem a more generally acceptable approach to the uplink power problem.



I also find a great deal of sense in the views of K4KQ, same issue, although I don't necessarily agree with his concluding statement. He does express, in part at least, some of my sentiments.

By the way, what's with OS? Is it control station problems or technical ones? I haven't heard anything from it on several passes lately when it was scheduled for Mode A. For the present A is the only mode I can operate (will fix that soon) so I miss it a lot when it fails to come up.

I get my current info from H.R. reports as I can't hear the nets. H.R. reports is doing a good job, too.

Maine is a nice state to live in, but when it comes to OSCAR interest, I have yet to meet another ham who uses the satellite so it is very hard to acquire first hand information on what equipment works and what does not.

An idea might be to have members write in and describe their equipment and publish a list of the most proven set-ups. Of particular interest to me is antenna designs and amplifiers for 432. So far my equipment is all home brew, so any information along these lines would be appreciated.

Through a sharing of technical information we could all learn something and improve our signals as well.

73's

Lyle W. Mabbot
W7KMF

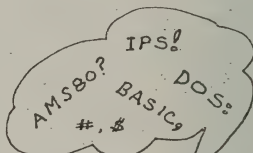
73's,

Alexander N. Gish, III
WB1GNL



I wish to reinforce W7QNI's comments which appeared in the June Newsletter.

I do also feel the Newsletter needs more technical articles especially concerning OSCAR 7 mode B and 8 mode J. I hear quite a few hams on these modes so what are they running for rigs?



THE PHASE III MICROPROCESSOR "THINKER"

Dear Joe



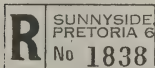
In response to your column entitled "Is this the future", a few comments from my point of view.

Using your suggested concept of a ground station would be reason for me to cease Oscar operation. The reason being, I enjoy making my own calculations, doing my own tracking and working directly thru Oscar. Using a ground station would be like a 2 meter repeater. Certainly, it would solve the problem of excessive power usage into Oscar, but there are other limitations imposed which have to be weighed against the good points. Some of these limitations would be that : 1. many operators living outside of major cities and obstructed by high terrain would not have access to the ground station. 2. With as many FM Repeaters on VHF and UHF on every available mountain top on the west coast, the ground station would fall victim to intermodulation either from other repeaters or from other nearby Public Communication Services. 3. The cost of local groups establishing ground stations would be somewhat steep, some smaller groups not being able to afford such expenditures. 4. Oscar could not be readily used with handheld units for emergency use when out of range of a ground station.

Joe, I could mention many more deficiencies for this concept, but for what purpose? If the prime objective is to discourage the use of high power, why not consider a more economically feasible method such as what Fred Siebert-K3PNL touched on in the Sept. 78 Newsletter. Incorporating some sort of compressor or limiter which would cancel a high power signal into the transponder and not be heard on the output would seem much more desirable. Such a method would only discriminate against the offenders. Why punish many for the ill deeds of a few?

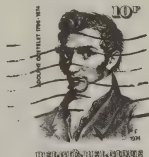
Joe, the first Phase III can no longer be modified at this late stage, but it is never too late for the Board of Directors and the membership to decide on what measure of control to incorporate in future satellites. Such a decision must be made now, or should have been made over a year ago. The problem at that time existed, however, I believe everyone was merely hoping it would go away by itself. Unfortunately, this won't happen.

Such are all the comments I have for this time. Have a happy holiday Season Joe.



With Respect,

W. Vern Hajek
W. Vern Hajek, K6UGS
AMSAT Member #4515



Clark Straw, N5XX of Hewlett-Packard recently donated a Hewlett-Packard Model 9871 Character Impact Printer for use with AMSAT's new computer system at the AMSAT-OSCAR Spacecraft Laboratory. Receiving the donation on behalf of AMSAT were Perry Klein W3PK (center) and Tom Clark W3IWI (right).

Scenes from the dedication of the AMSAT-OSCAR Laboratory.



AMSAT CANADA PROGRESS REPORT

10 OCTOBER 1978

The newest member in the AMSAT team became a full affiliate at the June 9, 1978 Board of Directors meeting.

The immediate goal of AMSAT Canada is to prepare flight qualified modules for geostationary launches in the early 1980's.

Originally formed as a study group in January 1978, some 20 licensed amateurs and supporters from seven major aerospace firms and Canadian Government departments in and around the Ottawa/Montreal area formed the expertise to develop a proposal for consideration by a leading aerospace company of a Synchronous Amateur Radio Transponder (SYNCART) on their experimental bus.

The reception of the proposal by both AMSAT and the aerospace company resulted in the formation of AMSAT Canada, fully affiliated, supported and in coordination and cooperation with AMSAT (U.S.). AMSAT Canada filed for formal incorporation, September 1978.

Utilizing the expertise available to the group, in developmental, research and operating fields of space communications, the group completed conceptual design studies and has begun the fabrication of an engineering module which is predicted for completion by the end of 1978.

Using the experience and knowledge of other groups, AMSAT Canada has been formed in two segments, Administration and Project. This allowed for uninterrupted project activity backed up by a team of Administrative support individuals whose duties include those associated with budgeting, management information, etc. The project teams are thus able to focus their expertise in well defined areas.

The project sector consists of one or several members of various expertise and disciplines as needed and form the following project teams:

- | | |
|------------------------|--|
| 1. System: | Configuration, design evaluation, problem solving |
| 2. Rx Converter: | Input filter coaxial, down-converter, multiplier |
| 3. IF Stages: | Various bandwidth and special discriminators, radar clipping, AGC control |
| 4. TX Converter: | Up-converter, filters, high power amplifier, output switching |
| 5. Multiplier Chains: | Support to receiver and transmitter converters
High stability and low spurious oscillator design |
| 6. Processor: | Internal housekeeping, fault locating, telemetry processing, CMOS system redundant |
| 7. Power Supply: | Dual voltage output, eclipse surge protection, failproof design, redundancy |
| 8. Control and Switch: | Internal power protection and isolation |
| 9. Assembly: | Commercial location, testing and measurements |
| 10. Qualification: | Space environment and testing available |
| 11. DOC/FCC (AMSAT): | Liaison done by senior management under direction of the Board of Directors |
| 12. Administration: | Minutes, insurance, supplies, membership, secretarial, Treasury, information, corporate duties, etc. |

A-O-7 STATUS REPORT

By Richard Zwirko, K1HTV

During the month of August, we began to notice an abnormal drop of the A-O-7 bus voltage when monitoring telemetry channel 3A. By the 4th of September, other strange things began to happen in the spacecraft when in Mode B. The entire telemetry string on both Morse Code and RTTY went sour, meaningless lines of numbers were copied, indicating on board problems. Since we had no telemetry at first, it was difficult to determine what had happened. When a switch to Mode A finally occurred, the telemetry began to make sense at times so some light could be shed on what was occurring. During the next few weeks a spacecraft emergency was declared while tests were run. The problem seemed at first to be voltage related so we tried to pinpoint the cause. The -10 volt switching regulators were changed by ground command with inconclusive results. We ran a teletype test, dwelling on the battery bus channel and A-O-7 jumped into Mode B, with the result being a set of meaningless zeros on that channel. The satellite developed a pattern of staying in Mode B for 24 hours which indicated that the on board clock was alright. But after switching back to Mode A, the 2-10 meter transponder would stay on for only 2 or 3 orbits and then switch back to Mode B for another 24 hour period. This made things even more difficult because of extreme Mode B command problems inherent in the spacecraft.

After a number of weeks of testing, the Mode A ban was lifted but the Mode B prohibition continued until Oct. 12th when it was determined that normal use of Mode B would probably not do any extreme damage to the spacecraft.

The consensus of opinion of the AMSAT technical crew seems to be that one cell in the upper half of the battery is acting strangely. Sometimes indications are that the cell is completely no good while at other times it seems to bounce back. However, this occurs only while in Mode A when the load is lighter. We don't expect the cell to do us much good with A-O-7 spending most of its time in "B". When the Mode B transponder was designed, the final P.A. devices used limited us to a 13 volt bus. Since the negative 10 volt regulator requires about 10.7 volts minimum to function, it doesn't take much more than one bad cell to result in loss of the regulator, which in turn causes loss of telemetry.

IF this condition remains or gets slightly worse, we will lose all telemetry data, however the A-O-7 transponders should continue to function as well as they have been during the first four years.

AMSAT GRATEFULLY ACKNOWLEDGES DONATIONS OF \$100 OR MORE FROM THE FOLLOWING NEW
LIFE MEMBERS

LM-946	Vernal F. Woolman, W5RSO	LM-966	Morton D. Cohan, WB2SBW
LM-947	G. Robert Mathews, K8TQK	LM-967	John Branegan, GM8OXQ
LM-948	Owen Wormser, K6LEW	LM-968	John D. Belenski, W7NEJ
LM-949	Briani Danilo, I2CN	LM-969	Robert McCaffrey, K0CY
LM-950	Richard S. Wujciak, K2RW/FP8AA	LM-970	Jay Holladay, W6EJJ
LM-951	Daniel O. Sanchez, LU1DFO	LM-971	Brian G. Hamilton, GI3VYY
LM-952	Jakob Brunner, HB9MNC	LM-972	Olof Lundberg, SM0CKV
LM-953	John G. Pronko, W6XN	LM-973	Des Cahill, EI9CV
LM-954	Robert Gosline, AE6S	LM-974	James Leonard, W4FPS
LM-955	Lawrence Guerrero, WB2NFJ	LM-975	Donald J. Lum, WA6ICW
LM-956	Rosario Vollero, I8KRV	LM-976	Fred Herron, VK2BHE
LM-957	Sam Belcher, WA7JUO	LM-977	M. Flament, ON5PX
LM-958	Jorge Abbott, H18JAF	LM-978	Alexis Demcenko, 3A2GX
LM-959	Dr. A.C. Beresford, Australia	LM-979	McRae McNaughton, VE3EQQ
LM-960	James V. Devilbiss, WA3FUJ	LM-980	Michael E. Casciolo, K1DZH/WB4DOD
LM-961	Chap. A.D. Prickett, W4CKS	LM-981	Otmar K. Popp, DL3SX
LM-962	Dawson K. Hargrove, W4OQP	LM-982	J.W. Heater, Amarillo, TX.
LM-963	Lyle W. Mabbott, W7KMF	LM-983	Kurt Schmidt, DL9OJ
LM-964	John M. Shea, VE5JS	LM-984	R.J.C. Broadbent, G3AAJ
LM-965	John W. Reimer, N6QC	LM-985	Kent Lingberg, SM0FKG
		LM-986	Ellis B. Merry, W8KI
		LM-987	Richard L. Wilder, K3DI
		LM-988	Edward Bosshard, HB9MTN
		LM-989	Enrico Carozzi, I2DSC

AMSAT 1978 ANNUAL REPORT

October 14, 1978

This report summarizes AMSAT's tenth year of activity. AMSAT, officially incorporated on March 3, 1969 will mark its tenth anniversary on March 3, 1979.

Highlights of 1978

AMSAT achieved several milestones during 1978. The first was the successful launch by NASA of the AMSAT OSCAR 8 satellite on March 5, 1978. The satellite is now in regular operation under the auspices of the American Radio Relay League (ARRL) for school use as part of the OSCAR education program. The satellite construction itself was a team effort by ARRL, the Japan AMSAT Association (JAMSAT), AMSAT Deutschland, Project OSCAR, Canadian AMSAT members, and AMSAT.

The second milestone was the establishment of a new AMSAT-OSCAR Spacecraft Laboratory at the NASA Goddard Visitor Center and office facilities for AMSAT use. We are using the facility for Phase III spacecraft construction and testing, and at the same time it will serve as a "craftsmen on exhibit" showpiece for visitors to Goddard Space Flight Center. Already Hewlett-Packard, Tektronix, KLM and several individual AMSAT members have donated equipment for the new laboratory.

With the acquisition of a condominium apartment in Washington near the Capitol, AMSAT now has expanded office facilities available for AMSAT's administrative functions.

Also during 1978 AMSAT quadrupled its fulltime staff with the addition of a fulltime Administrative Assistant, a Phase III Project Engineer, and a Phase III Aerospace Technician. All are helping to reduce the workload for our many volunteers.

AMSAT-Deutschland made significant progress on the Phase III spacecraft design and prototype construction. Vibration tests were completed on the spacecraft structure, in both the U.S. and France. Design work progressed particularly on the spacecraft/launch vehicle interface, the attitude sensor and control systems, and the transponder.

The Japan AMSAT Association (JAMSAT) completed their work on the AMSAT-OSCAR-D Mode J flight transponder and power regulator, and after launch of AMSAT-OSCAR 8 developed and have been producing ten-meter preamplifiers and 435 MHz receiving converters for users of OSCAR 8.

AMSAT-Italiana members have been actively involved in tests of a satellite transponder design using separate automatic gain-controlled passband segments. The approach is intended to overcome the problems of user overloading which occurs with the present linear OSCAR transponders.

AMSAT-Canada reorganized and formally incorporated this year. A very active hardware development team has been formed to develop a SYNCART (Synchronous AmateuR Radio Transponder) communications unit along with telemetry, telecommand and power conditioning subsystems. The prototype hardware is progressing well for inclusion on a Shuttle-launched commercial communications satellite as part of the spacecraft payload.

AMSAT-UK continued to be active in serving as a source of information to OSCAR users, particularly in Europe and Africa. AMSAT-UK members at the University of Surrey set up for telecommanding of the new AMSAT-OSCAR 8 satellite, and this same group is now considering constructing an OSCAR spacecraft themselves.

AMSAT membership continued to grow and now stands at 3,955 members (985 life members) in 75 countries. During the past year, we developed an in-house mailing list maintenance capability, and we are now about to convert to a floppy-disc storage system for our membership records which will be handled by our new AMSAT microcomputer system. This computer system will also be used for Phase III spacecraft testing and ground support, and for video display/graphics presentation at the new AMSAT-OSCAR Spacecraft Laboratory.

"CARIBE 78" DX-PEDITION

By Alex, W1CDC and Mac, W1ZSW

"Caribe 78", now history, still lingers on in the memories of two people, "Alex" Kasevich, W1CDC and myself, Bob "Mac"Gregor, W1ZSW. After a year of careful planning, the Caribe 78 team arrived in Dutch Sint Maarten, Netherlands Antilles on the 29th of July and started to set up to cover 40 through 10 meters on HF, 6 meters, 2 meters and 70 centimeters covering VHF, UHF and OSCAR.

The following morning, PJ8USA finally got onto the satellites with Alex at the key and Mac as set-up and antenna man. During the week that followed we managed to log a total of 50 OSCAR QSOs despite bad weather and power failures. On Friday evening, PJ8USA satellite station logged its last satellite QSO and tied the ribbons on PJ8USA to move onto the highlight of Caribe 78, the island of Montserrat, British West Indies.

After two brief, but enjoyable stops - the first on the island of St. Kitts and the second, the island of Antigua - we arrived on Montserrat. The task of setting up to get on the air was done smoothly and by morning on the 7th of August VP2MBC was on the air logging HF and satellite contacts quicker than you can say "OSCAR".

After two weeks of operating and sightseeing, the Caribe 78 team arrived home safely with its fourteen pieces of checked baggage comprised of: suitcases, antennas, and souvenirs.

The total contacts logged were:

3215 HF
105 Satellite
6 two-meters
1 six-meters

Now the chore of QSL cards is suddenly upon us!

P.S. "Caribe 79"? Check the DX news in your favorite ham radio magazine.



PERPETUAL ORBITAL PREDICTION PRINTOUTS AVAILABLE FOR RS-1 AND RS-2

By Bill Johnston, N5KR

Perpetual orbital prediction printouts of the same type supplied for AMSAT-OSCAR's 6, 7, and 8, are now available for the Soviet amateur radio satellites, Radio-1 and Radio-2 (RS-1 and RS-2). These printouts are computed for the user's exact station location, and consist of a series of tables of data, with a separate table for every possible longitude of equator crossing, in one-degree increments. (No table is printed for crossings which do not result in a pass usable from the user's location). Within each table is the time after equator crossing, plus azimuth, elevation, and range of the satellite, repeated at every one minute interval of time. Given the time and longitude of equator crossing, one simply refers to the printout table for that longitude for a complete listing of antenna pointing data at every one-minute interval of time. These printouts have been described in previous issues of the AMSAT Newsletter (September 1975, March 1978, September 1978), so further elaboration is not necessary here.

As before, the printouts are good for the life of the satellites and never become obsolete. Additionally, since both RS-1 and RS-2 have essentially the same orbital characteristics, one printout serves for both of them. The printout for OSCAR 8 is different, of course, as is that of OSCAR 7.

The orbits of RS-1 and 2 are somewhat higher than had been announced last year, but this has the advantage of giving a few extra minutes of communications on each pass. This also results in the printouts being about 15 to 20 percent larger than the ones for OSCAR 7, so there is a slight additional cost in producing and mailing them.

To obtain a printout, you will need to send the following:

1. Name and mailing address.
2. Town that you want the printout computed for. If less than 10,000 population, carefully describe location.
3. Payment to cover the cost of generating and mailing the printout, as follows:

\$4.50 via 4th class mail, worldwide.

\$5.50 via First Class mail, USA, Canada, Mexico

\$6.50 via Air Mail, worldwide.

(The OSCAR 7 and 8 printouts remain at \$4.00, \$5.00, and \$6.00, respectively, each.)

Send the above to:

Bill Johnston, N5KR
1808 Pomona Drive
Las Cruces, New Mexico 88001

OSCAR 8 PINS

New OSCAR 8 pins are expected shortly. If you have become a Life Member within the last several months and did not receive your OSCAR pin, please let us know. As soon as the shipment

arrives, we will start mailing out pins.

If you are an "old" Life Member and wish the new OSCAR 8 pin, they are available for a donation of \$5.00 or more.

AMSAT-80 COMPUTER PROJECT UPDATE

By Joe Kasser, G3ZCZ

Several new items have been added, including memory cards by Seattle Computer Products.

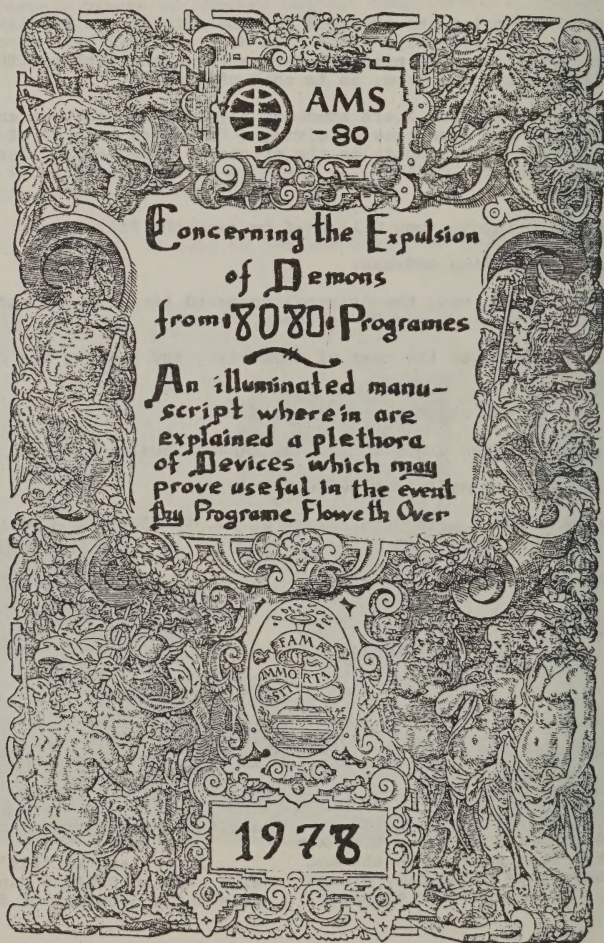
The AR-1 RTTY Card has been in hold for months now. It is 90% taped and holding. If nothing happens soon, all cheques will be returned. Please hold off on that item. We're sorry but circumstances have intervened.

AMS-80 is about to go into revision 5.8. This incorporates interfaces to Northstar software, changes the ASCII to BAUDOT conversion to reflect military usage and improves the USER instructions.

For the latest information, send an SASE for the flyer to:

Tom Clark, W3IWI
6388 Guilford Rd.
Clarksville, MD 21029

Cover of AMS80 Documentation.



CALL FOR PAPERS - DAYTON HAMVENTION

K.O. Learner, K9PVW is again arranging the space communications session at the Dayton Hamvention, to be held April 27-29 this year. He would welcome suggestions and volunteers for papers and speakers at the session. Please contact K.O. at 4012 South Hardebeck, Rd., Kokomo, Ind. 46901 (telephone 317-453-2947) immediately.

Look for the AMSAT booth at Dayton!

MEMBERSHIP RENEWAL NOTICE

AMSAT Newsletter Sept. 1978

Please complete form and mail to AMSAT as soon as possible.

Name _____ Call _____ License Class _____ ARRL Member? _____
Street _____ City _____ State _____ ZIP or _____
(Country) _____ Postal Code _____

Membership Number _____ or, check here if you are applying for new membership _____

Please indicate here if you have made one or more contacts on AMSAT-OSCAR 6,7 or 8

Mode A _____; Mode B _____; Mode J _____. Would you be willing to accept an AMSAT assignment in a technical area? _____ an administrative area? _____

Individual membership dues for January-December 1979,\$10.00
(Approx. half the dues are for subscription to the quarterly "AMSAT Newsletter")

**Include \$3.00 here if airmail delivery of AMSAT Newsletters is desired (in North America, include \$1.50 for First Class mail.)\$ _____

Affiliated Member Society dues for January-December 1979 (\$20)\$ _____

Life Membership (donation of \$100 or more)\$ _____
An AMSAT-OSCAR satellite pin is provided to new Life Members

A-O-7/A-O-8 Combined Orbit Calendar for 1979 (\$3)\$ _____
(Provided free to Life Members on request)

Life Member Society (donation of \$200 or more)\$ _____

Contribution toward AMSAT Phase III Satellite (Solar cells may be sponsored at \$10.00 per cell, battery cells at \$200)\$ _____

Other _____ \$ _____

TOTAL AMOUNT ENCLOSED \$ _____

(Please make your check or money order payable to "AMSAT" in U.S. funds*. We also welcome payment by VISA or MasterCard. Please give your account number and expiration date.)

*NOTE: Members outside the U.S. may send their AMSAT dues to their national organization: AMSAT-DL, AMSAT-France, AMSAT-Italiana, JAMSAT, AMSAT-Mexico, AMSAT-Nederland, AMSAT-UK, or NZART. Swiss dues can be sent to HB9OP. Members in countries with currency restrictions may send IRC's (@ 3 IRC's per \$1.00).

**AMSAT Newsletters will be sent via Second Class and Surface Mail unless additional postage is included. Life members receive their Newsletters by First Class or Air Mail.

YOU... AND AMSAT PHASE III

An exciting new era in amateur radio is about to begin... the era of AMSAT PHASE III OSCAR satellites.

The AMSAT PHASE III satellite program promises a continuing demonstration that amateur radio is at the forefront of modern technology. PHASE III satellites will routinely provide reliable communications over paths of up to 11,000 miles (17,600 km) for 17 hours each day. You can think of them as a resource equivalent to a new band.

The cost of these PHASE III satellites is a projected \$250,000. Commercial satellites of similar performance would cost nearly \$10,000,000.

Your help is needed to launch these PHASE III OSCAR satellites in 1981.

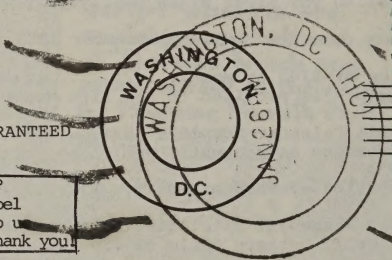
Your valued, tax-deductible contribution can be as small as one of the 5000+ solar cells needed. A handsome certificate will acknowledge the numbered cells you sponsor for \$10 each. Larger components of the satellites may also be sponsored with contribution acknowledgements ranging to a plaque carrying your name aboard the satellites. Call or write us for the opportunities available.

Your membership in AMSAT is important to the satellite program, and will give AMSAT a stronger voice in regulatory matters concerned with satellites. At \$10 per year or \$100 for life, you will be making a most significant contribution to the satellite program and the future of amateur radio. You will also receive the quarterly AMSAT newsletter.

AMSAT
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Address change or correction?
Please return the mailing label
portion of your Newsletter to us
and note the corrections. Thank you!



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